The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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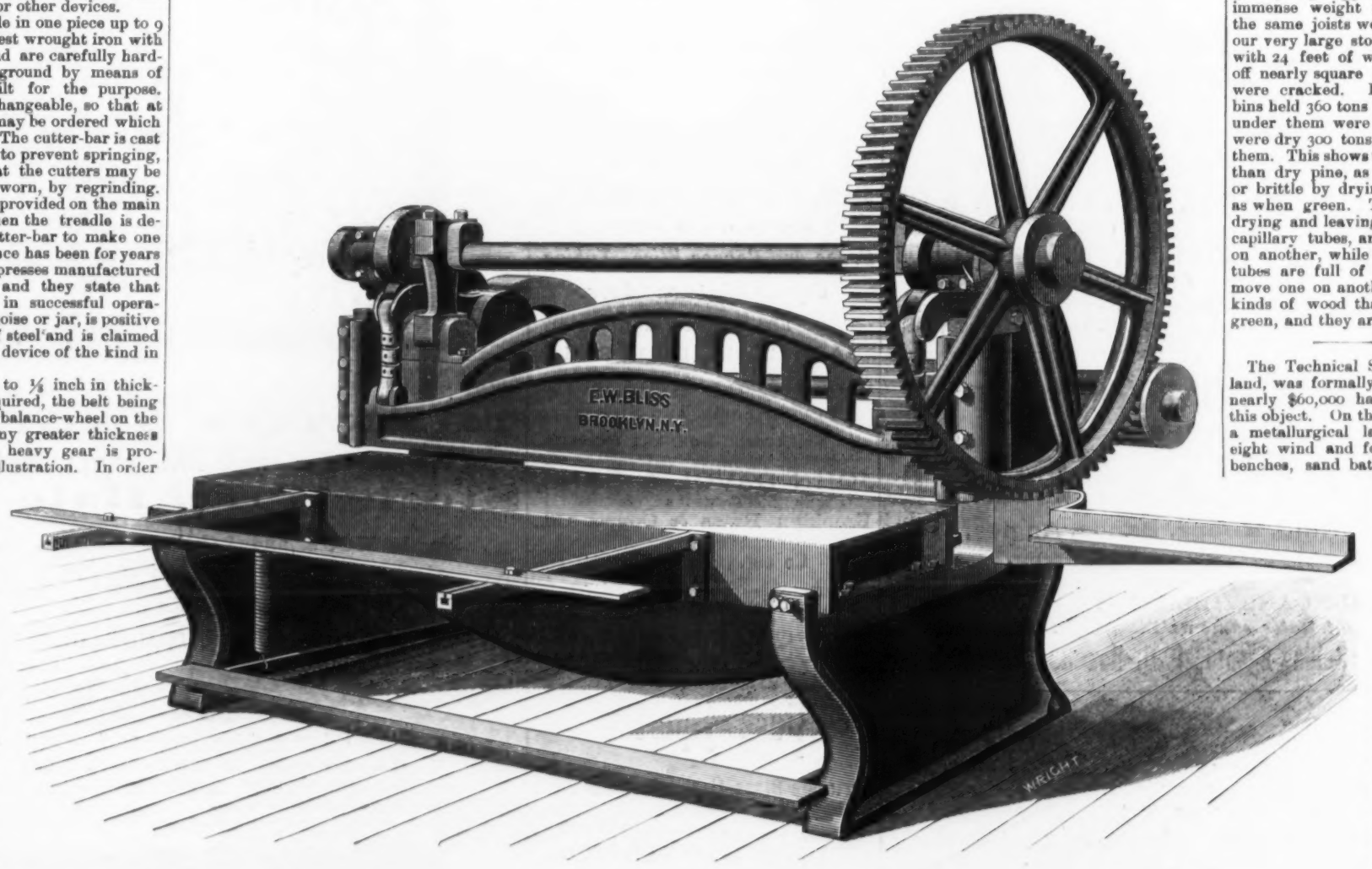
Power Squaring and Trimming Shears.

We present to our readers in this issue an illustration of a machine now coming into more general use than heretofore in sheet-iron rolling mills for trimming and squaring sheets before binding them for shipment. It is also valuable for cutting sheets to specified sizes on special orders. Manufacturers of kitchen boilers, tanks, sheet-iron pipes, &c., find it an almost indispensable machine for the economical manufacture of their productions.

As will be seen by the illustration, the machines are very substantially built and simple in construction. That they have proved very serviceable is attested by the numerous orders for them that have been filled by the manufacturers, Messrs. E. W. Bliss Co., of Brooklyn, N. Y. Two styles of these machines are built for cutting iron and steel up to ¼ inch in thickness. One of these will cut up to 9 feet in length; the other, with overhanging cutter-bar, will trim a sheet of any length or cut strips of any width up to 18½ inches. In both styles the motion of the cutter-bar is taken directly from a forged steel crank-shaft, without the intervention of levers or other devices.

The cutters are made in one piece up to 9 feet in length of the best wrought iron with steel-cutting faces, and are carefully hardened and accurately ground by means of special appliances built for the purpose. They are made interchangeable, so that at any time new cutters may be ordered which will fit the machines. The cutter-bar is cast very heavy, is ribbed to prevent springing, and is so arranged that the cutters may be easily adjusted, when worn, by regrinding. An automatic clutch is provided on the main crank-shaft, which, when the treadle is depressed, allows the cutter-bar to make one stroke. This contrivance has been for years in use on the power presses manufactured by Messrs. Bliss Co., and they state that thousands of them are in successful operation. It acts without noise or jar, is positive in its action, is made of steel and is claimed to be the most durable device of the kind in the market.

For cutting plates up to ⅜ inch in thickness gearing is not required, the belt being applied directly to the balance-wheel on the crank-shaft, but for any greater thickness an extra shaft with a heavy gear is provided, as shown in the illustration. In order to hold the sheet securely in place while being cut, a heavy clamping bar is placed just in front of the cutters, which is brought by a cam motion down upon the sheet, firmly holding it while being cut, after which it is automatically raised, releasing the sheet. It is made adjustable to allow for variation in thickness of sheets. In the straight-side shears, which are used both for trimming the sides and squaring the ends of sheets, adjustable gauges are provided on extension arms in front parallel with the cutters, so that after one edge is trimmed and the sheet reversed the trimmed edge may be placed against the gauge and the opposite edge trimmed parallel with it. A side gauge is also provided exactly at right angles with the cutters, so that after the sides are trimmed they may be placed against these end gauges and the ends of the sheets trimmed square with them. In the overhanging shear, which is intended to trim sheets longer than the cutters, there is provided, in addition to the front gauge, a side gauge which is in line with the cutters, so that a long sheet, after having a portion of its side trimmed, may be moved along and so gauged that the second cut will be in line and true with the first.



NEW POWER SQUARING AND TRIMMING SHEARS, BUILT BY MESSRS. E. W. BLISS CO., BROOKLYN, N. Y.

SCIENTIFIC AND TECHNICAL.

Etching Metallic Surfaces.

Improvements in etching metallic surfaces have recently been patented in England by a Mr. A. Piper, of Wolverhampton. The article under treatment is coated or plated by the ordinary mode of electro-plating with gold, silver, nickel, brass, copper, &c., upon the surface of which deposit the required design is painted with an acid-resisting substance, and those parts not required to be ornamented are protected with the same substance. The article is then immersed in an acid which eats away the coating or plating from the unprotected parts, at the same time producing a frosted or dead surface upon the naked metal upon those parts. The chloride deposited by the acid is removed by simply dipping in aquafortis. The acid-resisting substance is then removed by washing in a spirit or in oil, which leaves the design standing in relief, and of the color of the metal with which it was coated or plated, upon a frosted or dead ground of the color of the base metal. Thus, if the article be copper-plated with silver, the design would be white upon a dead copper ground. Or the effect may be reversed—that is, the design be sunk, and of the color of the base metal—by protecting the bulk of the article with the acid-resisting substance, and leaving the design exposed to the action of the acid, and proceeding as before. Thus, if the article be copper-plated with silver, the design would be a dead copper color upon a white ground.

A New Electric Mine Lamp.

Iron describes a lamp recently brought out in London for underground use: This lamp consists of a metal casing 7 inches high by 3½ inches wide and 3 inches deep from front to back, and which contains the battery. Projecting from the front of the case is a three-candle glow lamp of German make, which is properly protected, and has a reflector. The battery is composed of three cells, each 6 inches by 3 inches by 1 inch, and each cell consists of a packet of chloride of silver and two thin zinc plates with a weak solution of caustic potash. This battery produces an excellent light of three-candle power, and which, it is stated, will last nine hours. There is, however, no waste of the elements, but at the end of that time the chloride of silver becomes concentrated into pure silver, and is revivified by being washed in a solution of nitric and hydrochloric acids. This restores the silver to its active condition, and it is replaced in the battery for futher use. The current given off by this battery is in excess of the requirements of the miner; but smaller lamps are made, notably one of circular form 3 inches in diameter and 3 inches deep, and of two-candle power, burning for five hours. Another, of the quadrangular type, is 6 inches high, and of three-candle power, but only burning for seven hours and a half. The cells are hermetically sealed, so that there is no fear of escape of the liquid portion of the contents, and the lamp can be inclined at any angle without fear of extinction. This cannot be said of the ordinary miner's oil lamp, which is calculated to cost very much more for maintenance than the new electric lamp. The miner can hang the lamp up or carry it in his hand or belt, and he can be allowed to have command over the light, and by a small set-screw to turn it on or off; but this screw can be removed if desired. He cannot, however, interfere with either the battery or the lamp, both of which are locked against him, and the key is kept in the lamphouse. Another important point is that this battery is not in action when not being used, and so there is no waste.

A New Application of Composite Photography.

Dr. Persifor Frazer, of Philadelphia, recently made an ingenious and novel application of the principle of composite photography, which deserves to go on record, since it exhibits very clearly the fallacy of underestimating the importance of a scientific idea because of its presumable lack of practical applications. In a case before one of the courts, involving the validity of a number of signatures, the question was referred to Dr. Frazer as an expert. Instead of resorting to the old and unsatisfactory method of the testimony of handwriting experts, Dr. Frazer was induced to apply the principle of composite photography. This principle, as has been explained in repeated references to the subject, was discovered recently by an English scientist, Francis Galton, and consists substantially in producing a photograph which is an embodiment of a number of originals. It is done by taking the photographs of each subject separately, giving each plate, however, only a fractional and proportionate amount of the time requisite for its proper development. For instance, if six plates are to be utilized in making up the composite, and each plate would ordinarily be given 30 seconds' exposure, the exposure is reduced in each case to five seconds, so that the resulting composite will be made up from these indistinct originals. In this way only these features which are common to all of the originals appear distinctly in the composite, while the divergencies and irregularities are lost. The discoverer obtained remarkable results in securing types of criminals, persons afflicted with pulmonary troubles, family likenesses, &c. Subsequently the application was extended to Germany to embrace "ideal" mathematicians, artists and poets. In this country it has been utilized by Mr. W. Curtis Taylor and others for producing an ideal, or probably typical, photograph of Washington, the ideal scientific man, &c.

Dr. Frazer was given 18 checks, the signatures to which were admitted to be genuine. These he divided into three groups, according to the size of the handwriting. Some of the checks were used in two groups, so that each one of the three composites was made up of about a dozen checks. The result was that in each one of the plates the signature "Clark & Co." was quite distinct, the only indistinct and superfluous lines being about the first two letters. Judge Hanna, before whom the audit took place, said that the plates where certainly trustworthy guides, and that he regarded the discovery as a very important one in connection with the identity of handwriting. The advantages of the method are that it gives a signature in which only the essentials or invariable strokes appear distinctly, while the eccentricities and exceptions, which always appear in any particular signature, are lost; while the appearance of the indistinct and superfluous lines shows in what portion of the signature the writer was in the habit of varying. The successful application of the principle of composite photography for the purpose here described opens an entirely new field for it, in which it gives promise of yielding most valuable results.

Scouring Action of Water.

Responding to an inquiry as to the base taken by engineers in calculations of the carrying power of water to determine the scouring action of a river on its bottom, the *Manufacturer and Builder* says: "The carrying or transporting power of water increases as the sixth power of the velocity—a prodigious rate of increase, as may be inferred from the fact that a stream having a velocity six times as great as another will be able to transport material weighing 46,656 times as much as that carried by the slower stream. The data from which engineers commonly calculate the effect of a scour on a river bottom are about as follows: A stream flowing with a velocity of 3 inches per second barely produces an effect on fine clay; 6 inches per second will raise fine sand; 8 inches per second will raise sand of the coarseness of linseed; 12 inches per second will sweep along fine gravel; 24 inches per second (or 1⅓ miles per hour) will carry pebbles of about 1 inch diameter; 36 inches per second (which is about 2 miles per hour, or about two-thirds the rate of speed of a moderate walk) will sweep along fragments the size of an egg."

Corrections of Thermometers for Pressure.

Referring to errors in thermometer indications, owing to pressure upon the glass bulb containing the mercury, Messrs. E. P. Venable and J. W. Gore, in a recent issue of *Science*, write that no reference to corrections covering this case could be found by them, and that, accordingly, they resorted to experiment to test the amount of possible error. A few experiments, carried out with some fine Geissler thermometers, showed for a spherical bulb an increase of 0.16° F., and for a cylindrical bulb an increase of 0 27° F. for an additional atmosphere of pressure. Clearly, the amount of increase will depend upon the nature of the glass bulb, its thickness, size and shape. Many observations on vapor pressure, on boiling points under increased or diminished pressure, meteorological observations at unusually high stations or in mines, are subject to this correction; and, as no general correction will be satisfactory, each thermometer will have to be separately tested.

Fluting Stone by Machinery.

A new process for smoothing, polishing and fluting stone by machine-power without the use of edge tools is now being tried in England. This process consists essentially in causing a revolving or reciprocating surface of iron to alternately bear against the surface of the stone to be worked, and then parted from it sufficiently to receive a layer of fresh sand and water between the rubbing surface and the rubbed. The rubbing surface is held down by a spring, but at intervals is raised from the rubbed suface by an eccentric cam. For fluting and similar operations a series of round bars of wrought iron are mounted in bearings and made to revolve; at the same time they are given a reciprocating movement. The block of stone to be fluted is placed on a trolley and run under the bars. Sand is sprinkled automatically over the bars or rollers as they revolve. For recessing, edge molding and similar purposes rubbing disks are mounted on vertical spindles arranged to lift automatically for about half a revolution in every four. Several different types of machines are now in actual operation. An advantage claimed for this process of working over hand labor with hammer and chisel, or machine work where cutters are forced into stone, is that the surface of the stone is left perfectly smooth and "unstunned," and better capable of withstanding atmospheric influences. It is stated that fluted, recessed and ornamental stone is now being sold by the inventors at 75 per cent. less than similar work produced by hand.

Relative Strength of Wet and Dry Timber.

In reply to a statement by the *American Miller*, that "wet timber is not as strong as dry, in some cases it has not half the strength of dry," a correspondent of that paper writes as follows: "In September, 1876, the Lanesboro Mills, Lanesboro, Minn., burned, and that fall we rebuilt them and began making flour the next March. We used sawed pine (taken out of the Mississippi River) for joists, 3 x 12 inches, 12 feet long, and sized them, laying them on top of the girders, to get their full strength, and then used ⅞-match flooring. The joists were placed 12 inches from center to center, leaving 9 inches between them. In the fall of 1877 we piled wheat on the floor 26 feet deep in the bins, and the joists, yet wet and green, only sagged a trifle, and carried the immense weight safely. Two years later the same joists were dry, from the heat of our very large stove. We loaded the floor with 24 feet of wheat, and six joists broke off nearly square in the middle, and others were cracked. In the first instance the bins held 360 tons of wheat while the joists under them were green. When the joists were dry 300 tons or less broke several of them. This shows that green pine is stronger than dry pine, as the wood becomes brash or brittle by drying, and is not as strong as when green. This is caused by the sap drying and leaving only solid matter in the capillary tubes, and they cannot move one on another, while if the timber is green the tubes are full of water, and can bend or move one on another. I know of but two kinds of wood that are stronger dry than green, and they are maple and white oak."

The Technical School, at Sheffield, England, was formally opened a few days ago, nearly $60,000 having been collected for this object. On the basement story there is a metallurgical laboratory fitted up with eight wind and four muffle furnaces, with benches, sand baths and all necessary appliances for a complete metallurgical course. This laboratory is one of the most complete in Great Britain, measuring 42 feet 9 inches by 35 feet, and is 21 feet high. Adjoining there are separate balance stores and attendance rooms. There is also a room for the professor and a preparation-room. On the same floor is the metal-testing room and a mechanics' shop. In the latter there are two 9-inch sliding surfacing and screw-cutting lathes, two 6-inch ditto and one 5½-inch ditto, a planing machine 8 feet by 2 feet 6 inches, a shaping machine with two tables, a vertical drilling machine, fitters' vises and benches for additional students. On the first floor there is a commodious pattern shop containing a circular saw, a 6-inch treadle lathe, with joiners' benches and all necessary bench tools. Adjoining are an engineering laboratory, a mining-lecture room, two classrooms and students' library and reading-room. The upper story is devoted to engineering drawing. The drawing office, 97 feet 6 inches ong by 27 feet wide, is furnished with desks, cupboards, and every convenience for drawing-office practice. Adjoining there are a machine construction lecture-room, a professor's room and a room for mounting drawings. A wing of the main building contains a 20-horse-power vertical tubular steel boiler, with an engine adapted to work either as a simple high-pressure, a compound or a condensing engine, and otherwise adapted for experimental work. Near the engine-house there is a smith's shop and foundry. In another part of the building there are two rooms fitted with cases containing specimens of minerals and metallurgical products, models of engineering contrivances and other objects of interest.

From estimates which are not complete *Bradstreet's* makes the total production of coal in the United States last year as 96,931,775 tons, against 99,143,013 tons in 1884, 96,874,847 in 1883 and 86,849,116 in 1882. Of the total production last year 65,308,246 tons were bituminous and 31,623,529 anthracite. The production of bituminous coal in 1884 was 68,424,720 tons, so there was a falling off in 1885 of more than 3,000,000 tons. Pennsylvania produced two and one-half times as much of this coal as any other State, the estimate being 25,000,000 tons, or an increase of 1,000,000 tons over 1884. The falling off was chiefly in Illinois, which is the second State in production, and other Western States, while those of the South, with the exception of Tennessee and Georgia, slightly increased the output.

Profits in Iron-Making in Germany.

Consul Warner, of Cologne, has compiled the following table, with a view to give an idea of the condition of the German iron and steel industry. It aims to show what dividends have been paid by leading stock companies during the past four years:

Companies.	Dividends. 1881-2. Pr.ct.	'82-3. Pr.ct.	'83-4. Pr.ct.	'84-5. Pr.ct.
Aachen-nongener Bergwerk	0	0	0	0
Aplerbecker	5½	5	5	4½
Aplerbecker Hutte	15	12	4	0
Bergischer Gruben Verein	4 1-6	3	0	0
Berzelius	7	8	6	5
Bismarckshutte	10	9	8	8
Bochumer Bergwerk	0	0	0	0
Borussia	0	3	5	0
Donnersmarkhutte	2	3½	3½	1
Dortmunder Union	4	5	1	1¼
Eschweiler	3½	4	2	1
Gelsenkirchen	7½	7	7	6
Hagen Gruenthal	5	7½	6	0
Hagener Gusstahlwerke	8	11	7	3
Harkort	3½	4	4	0
Harpener	2	3½	0	0
Koeln Muesen	3	0	0	0
Koelner Bergwerk	5	5½	7	5
Koenigin Marienhutte	6	8	4½	4
Koenig Wilhelm	0	0	0	0
Louise Tiefbau	1	2½	2	0
Maerkisch Westfaelische Bergwerke	0	3	0	0
Phœnix	6	6	3½	2½
Mechernich	13	13	15	12
Menden and Schwerte	0	0	0	0
Redenhutte	5	10	3	0
Rhein-Nassau	3	3	2	1½
Stadtberger Hutte	4	4½	4	2
Vulcan	5	10	3	0
Average dividend	4.4	4.9	3.4	1.9

This table is a fair specimen of the shipshod manner in which much of the work of our consuls is done. We are not familiar with all of the companies named, but we do know that the Borussia, Koenig Wilhelm, Louise Tiefbau, Gelsenkirchen and Kölner Bergwerk are collieries, the Mechernich is the largest lead producer in the world, and the Rhein-Nassau Co. are producers of lead and spelter. We suspect, though we do not positively know, that the Berzelius, Bergischer Gruben Verein, Hagen Gruenthal, Köln Müsen and Märkisch Westphälishe Bergwerke do not make a pound of iron, while the Stadtberger Huette, so far as we are aware of, produces only copper. This, it will be observed, reduces the list to about one-half, while, on the other hand, a dozen large concerns could be mentioned as missing which are among the leading iron stock companies in Germany, and who publish reports.

The English Bayonet Test.

The former test for the ordinary triangular Martini-Henri bayonets was to bend them over a simple bridge like the bridge of a violin, and in the case of swords they were bent by hand to a bow of about 4 inches. Bayonets and swords, even if weak, would stand these tests. Now, however, the tests are extraordinarily severe. The bayonet has its point pushed into a socket or shoe, and it is then bent by hand pressure over a wood arch of a segment of curve equal to nearly its entire length, and which has an elevation at its central part of 2½ inches, the hilt end of the bayonet being bent over to the extent of more than 4 inches. The metal must then spring back to its former condition without the slighest permanent set. This test is applied to all the three sides of the bayonet. It is then tested by torsional strain by being fixed in an apparatus in which the strain of 80 pounds suspended weight is applied. Finally, it is struck by hand with the hardest blows upon each of its sides against a solid oak block, by which, if any flaw exists, the bayonet will be certainly broken. If the slightest permanent bend or set can be detected after these proofs the bayonet is at once rejected. To swords similar crucial tests are now applied, one of the most important features being the introduction of a test for proving the rigidity of the sword, besides the tests for proving its temper or flexibility.

The artillery carbine saw-bayonet is subjected to a test of this class. But the most searching of all the tests are those applied to the cavalry swords. These are 34½ inches long, and $\frac{5}{16}$ inch thick at the back. Each blade is first bent over a wood arch of nearly its own length to the extent of 2 feet at its hilt end, its point being fixed. It is then put in a frame perfectly vertical, and it must stand a weight of 32 pounds upon it without the slightest indication of any deflection. The Enfield blades stand this test to the extent of 36 pounds. The blade is next forced down by leverage to the extent of 6 inches, bowing proportionately on either side. Two powerful cuts are then made by hand against a wood block, one with the front edge, the other with the back. The sword blade is then tested by being placed in a trough or mold finished up to a mechanical fit. The handle and guard being riveted on, the like tests are applied to the finished sword. The ordinary swords in the service are of the 1882 pattern, and, like the bayonets, are slightly too light and weak at the ends of the blades. The new swords of the 1885 pattern are heavier, and are strengthened by a greater thickness and depth of metal at the cutting portion of the blade. The new bayonets are 3 ounces heavier in weight than the former Martini-Henry bayonets, although of the same length as the original pattern. All the present forms of bayonets are destined, it would seem, to give way to the latest pattern sword-bayonet, which will probably receive general acceptance as the finest and most useful weapon ever associated with the rifled musket.

H. Weeks, of Boston, Mass., has patented an improved process of making cut nails from nail strips or plates. A nail-plate of uniform thickness is prepared for use by having its scale removed. Horizontal scores, recesses and grooves are then formed on one or both surfaces, at or near the head or upon any other portion of the surface. The strip is then submitted to the action of a cutting device, whereby its end is shaped to form one edge of the nail. Finally the strip is acted upon by another cutting or severing device which removes or severs the completed nail from the strip. The nails formed by this prodess are particularly adapted for boot, shoe and box nailing machines.

Latest Legal Decisions.

BILL OF LADING—STIPULATION AGAINST LIABILITY FOR DELAY.

A bill of lading had the stipulation that "the carrier shall not be liable for loss or damage of any kind occasioned by delays from any cause," and in a suit for damages for the failure to deliver a shipment of cotton in due time the defense was set up that the bill of lading absolved the carrier from any responsibility for the delay. The plaintiff recovered, and the defendant appealed the case—Berge *vs.* Texas and Pacific Railroad Co—to the Supreme Court of Louisiana, where the judgment was affirmed. Judge Manning, in the opinion, said: "1. The clause stipulating for non-liability from loss from delays from any cause has uniformly been held to be unreasonable, and the insertion of it in a bill of lading will not relieve the carrier from liability for losses occasioned by negligence. 2. The breech of the contract in this case was active; a negligent delay in delivering the cotton, or a defective execution of the contract to carry it, put the defendant thoroughly in default, and he must respond in damages. 3. As to the damages: First, There is the loss in replacing the undelivered cotton by buying other cotton in the market at the advance price. The plaintiff had the right to expect the cotton at or near a fixed time. His contracts with others were made on that expectation, and when he was disappointed he had to go on the market and buy to replace that which the defendant had contracted to deliver. This item is not for protection, but for actual loss—not for the loss of profits, but for an outlay of money. The whole theory of damage is based on indemnity, and the indemnity here asked is of money expended in buying cotton which the plaintiff would not have had to buy if the defendant had delivered the cotton in reasonable time. Second, Then there is the item of extra expenses incurred in reweighing and reclassing the cotton, and for extra drayage because it was received in small quantities or driblets—in other words, damages for negligent delivery. This, of course, must be allowed. And then, in the third place, is for the loss of the market on 317 bales, and the loss of interest. These must be given; they have been fully proved. The judgment, clearly, must be affirmed."

SALE—DELIVERY BY INSTALLMENTS—FAILURE TO DELIVER OR TO PAY.

B., a dealer in bark in Virginia, made a contract with R., a tanner in New Jersey, to send him one carload of bark weekly until a certain quantity was delivered. Five carloads were delivered, accepted and paid for without objection; but when the sixth load was about to be sent on, R. requested some delay, and B. was prevented from making further deliveries only by the peremptory refusal of R. to receive any more bark from him. B. protested, proposed an arbitration, and threatened suit if R. persisted in his position, and finally brought this action and recovered. In this case—Blackburn *vs.* Reilly—the defendant carried the judgment to the Supreme Court of New Jersey, and then to the Court of Errors and Appeals of New Jersey, where it was finally affirmed. Judge Dixon, in the opinion, said: "This contract belongs to a class of agreements sometimes called 'continuing contracts of sale,' because they are to be completely performed, not by single acts of delivery and payment, but by a series of such acts at stated intervals. The rule to be applied in determining whether the express obligations of such contracts remain after one or more breaches by either party has been the subject of much discussion of late years, and has given rise to some contrariety of judicial opinion. Without going into details, we are of the opinion that the rule established in England by the judgment of the House of Lords, in Mersey Steel and Iron Co. *vs.* Naylor, 9 Appeal Cases, 434, is one which, in ordinary contracts of this nature, will work out the results most conformable to reason and justice. That rule is that defaults by one party in making particular deliveries or payments will not release the other party from his duty to make the other payments or deliveries stipulated in the contract, unless the conduct of the party in default be such as to evince an intention to abandon his contract or a design no longer to be bound by its terms. This rule leaves the party complaining of a breach to recover damages for his injury on the normal principle of compensation, without allowing him the abnormal advantage that might enure to him from an option to rescind the bargain. This rule is not applicable where the parties to a contract have expressed their intention to make performance of a stipulation touching a part of the bargain a condition precedent to the continuing obligation of the contract. It is very clear here that the plaintiff had not abandoned or repudiated the contract."

PARTNERSHIP.

A relative of one of a firm lent her relative a large sum of money, and afterward lent him a further sum, for all of which a note signed by the member of the partnership was given to her. The money was lent to be put into the firm, and it was put in, and constituted the greatest part of the capital of the house. On the insolvency of the concern the creditors sought to defeat a mortgage given to secure the loan, which also was signed by each of the members of the firm in their individual names, on the ground that the notes and the mortgage were the individual obligations of the members, to which the firm debts took precedence as claims on the partnership property. The creditors succeeded in the trial court, and the case—Carson *vs.* Ryers—was carried to the Supreme Court of Iowa, where they were defeated. Judge Rothrock, in the opinion, said: "The notes and mortgages were given for the debt of the partnership, and the mortgage is the first lien on the firm property. The fact that the note and mortgage were not executed in the partnership name is of but small consequence in determining the rights of the parties. When property is not only obtained for and applied to the benefit of the firm, but it is obtained by the joint act and upon the joint written obligation of all its members, and the credit is given to all, the transaction is in substance a copartnership transaction, though the firm name is not actually used in the writing, and though the partners have superadded to this joint obligation the several liability of each of them."

AGENCY—AUTHORITY TO WARRANT.

Z. was authorized to sell certain personal property to F., and in the sale he gave a warranty of the quality, and made false representations as to character of the property. The purchaser, D., finding the warranty not true, and that he had been deceived, sued F. upon the warranty and for deceit, to which F. answered that Z. was his agent for sale only; that he was not bound by his warranty, nor liable upon his false representations. A judgment was recovered, and the defendant carried the case—Decker *vs.* Fredericks—to the Supreme Court of New Jersey, where he prevailed. Judge Reed, in the opinion, said: "1. No implied authority to warrant arises from an agency for the purpose of making a sale. The principal is not responsible for not revealing, or for his agent's failure to reveal, defects in the property, though it was known that they existed. 2. To what degree are the fraudulent representations of his agent imputable to the principal? The purchaser upon discovery of the fraud can treat the contract as voidable, because of the fraud which led to it, and he rescinds by returning the property purchased, and can sue the principal for the consideration paid, or he can retain the fruits of the contract and bring his action against the agent who made the fraudulent representation for deceit. This is the extent of his remedies. He cannot sue the principal for the deceit of his agent unless he can show the principal's participation in the deceit."

NEGOTIABLE INSTRUMENTS—STOLEN BONDS.

B. was the owner of $41,000 of Louisville coupon bonds, and he sued the city for certain unpaid interest on them, without presenting the coupons. The city defended on the ground that it had paid these coupons to the holders of them, some before maturity and some before they were due. It appeared on the trial that these bonds had been deposited for safe-keeping in a Baltimore bank and had been stolen, and that the owner had given the city notice of his loss, with the numbers of his bonds. The city made no inquiry of those to whom it paid the coupons as to the method they had taken to get the coupons, relying upon what it supposed to be the law—that the bonds and coupons, being negotiable instruments, were valid in the hands of the holder of them. In this case—Bainbridge *vs.* City of Louisville—the plaintiff was defeated and he appealed to the Court of Appeals of Kentucky, where he succeeded. Judge Pryor, in the opinion, said: "The universal doctrine of the textbooks on the subject is that the maker is liable to the owner of the paper, after notice of the loss, if he pays the money on the paper to another, without requiring the latter to establish a clear title, in the event of its subsequently appearing that he was without title. While the rule requiring such inquiry may work some inconvenience to the maker of the paper, still it is better that he should suffer this temporary annoyance than to deny to the real owner all remedy when he has lost the evidence of the liability, and for no other reason than that the paper lost is a negotiable instrument. When the loss by the owner is proved the burden of proof shifts and the holder must show that he acquired the paper in good faith for value and before maturity, or from some one who had a perfect title. It was incumbent on the city of Louisville in this case, having had undoubted evidence or notice of the loss of the paper, to show when payment had been made after the loss, and the notice thereof that the holders were purchasers in good faith before maturity and for value. The mere belief that the party presenting the paper was an innocent holder was not sufficient. The notice of the loss put the city on inquiry, and, as to the coupons paid, a perfect title in the holder must be shown. That the law may presume the holder of such paper to be a transferee for value affords the maker no protection when the paper has been lost by the original owner and notice brought home to the maker before payment."

Bridge-Building in the United States.

The material for nine of the largest bridges in the United States is being tested by the Pittsburgh Testing Laboratory. The cost of the bridges will range from $5,000,000 to $450,000. Captain Hunt returned recently from New York, where he was consulting with United States Engineer Gen. Q. A. Gilmore in regard to the St. Paul bridge across the Mississippi River. It will be a suspension bridge, much larger than the St. Louis bridge, and will be made strong enough to carry a batallion of artillery at a trot. It is to be constructed jointly by the Government and the city of St. Paul. One end of it will be at the fort in Rob street, St. Paul, and the structure will extend over the top of the three bridges now at that point. The material is being made by the Morse Bridge Co., of Youngstown, and the Union Rolling Mills and Wilson, Walker & Co., of Pittsburgh. The second bridge is to be built by the Union Pacific Railroad Co., across the Missouri River at Omaha to Council Bluffs. The present two-track structure will be replaced by one having four tracks. The iron for it is being made by the Union Bridge Co., of Buffalo, and by the Union Rolling Mills, Wilson, Walker & Co., and Graff, Bennett & Co., of Pittsburgh.

The next two are being thrown across the Mississippi River at Grand Rapids by that thriving city, to be known respectively as the Sixth Street and Pearl Street bridges. They are being made in Pittsburgh. The fifth, by contract, is held in Pittsburgh, by the Keystone Bridge Works, for all the iron bridges on the Virginia Midland Railroad. The next two are being constructed by the Union Bridge Co., of Athens, N. Y., for the Atchison, Topeka and Sante Fé Railroad Co. This bridge company also have the structural ironwork for the Harlem River stone bridge, of New York, and over which

so much of a row was made in the New York Legislature because the contract was let privately, and not by being publicly advertised for bidders. The last on the list is the Dauphin County bridge across the Susquehanna River, near Harrisburg. The Harlem bridge will be the largest stone bridge in the world. It is to have a span of 250 feet. All the others are "go-as-you-please" suspension bridges.

Recent Failures in Steel Plates.

Mr. Wm. Kent, of New York, in a paper read before the Institute of Mining Engineers, at Pittsburgh, gave a statement of the facts contained in a contribution to the *Engineer* by Arthur J. Maginnis, to which we alluded editorially at the time. Mr. Kent reproduces the theories which were brought forward in the technical press to account for the failures, and then brings forward his own views, as follows:

It does seem to the writer that the theories quoted are sufficient to account for the failure of the steel plates in question. The "internal strain," "too large plates," "too small ingots," "too little work," "homogeneity" and "crystallization" theories all seem to be answered by the facts that internal strains must exist in all steel plates which have any work done on them while in a cold state, even if subsequently annealed, unless the annealing heat and the rate of cooling are uniform throughout the plate; that very much larger plates than those used in the two steamers are now in common use; that thousands of plates have been made of small ingots; that other thousands have had too little work put on them; that all steel plates are supposed to be homogeneous, and all are supposed to be liable to crystallization, and yet that not one nor all of these causes combined is sufficient to make the chance of sudden fracture of any plate as much as one in 10,000, and that of all the hundreds of thousands of steel boiler plates which must have been put in service in the past 25 years, many of which have been subjected to most severe usage in the boiler shop as well as in the boiler itself, there is not on record another single case in which a steel boiler went to pieces while it was not under pressure and after two and a half years of service. The startling coincidence of the peculiar fractures in six boilers, three on one vessel and three on another, in both vessels after two and a half years' use, would indicate, if we knew nothing else about their history, that the steel in these two boilers was of the same quality, and that quality very different from that common to steel boiler plate in general; but when we know that the steel came from the same works, and the boilers were made by the same maker, the conclusion is irresistible that the steel was very different in some one quality or other from all other boiler-plate steel of which we have any knowledge, or else that the treatment in the boiler shop was something very different from that to which steel boiler plate is usually subjected. The last supposition is so highly improbable that we are narrowed down to the one conclusion that there was something the matter with this particular lot of steel which differentiates it from all ordinary boiler-plate steel.

One paragraph only in all the newspaper communications concerning this failure seems to favor this view—the letter of "Basic," above quoted: "Messrs. Jack, of Liverpool, made these boilers, and over 40 per cent. of all the plates supplied failed to pass the tests and were returned to their makers." If 40 per cent. of all the plates sent were rejected, even under the comparatively easy tests of Lloyds and the Admiralty, and out of 40 tests recorded of those accepted 20 per cent. would have been rejected for too high tensile strength on the specifications of the Pennsylvania Railroad for fire-box steel, and 75 per cent. would have been rejected for insufficient ductility on the original specifications of the Government for the boiler plates for the United States cruisers, it must be conceded that the steel was a "bad lot."

To charge the failure of this steel to the treacherous nature of steel in general, and to say that nothing the steel-maker can do will prevent such failures, is both illogical and unscientific. If the failure of steel boiler plates were a matter of every-day occurrence we might justly call steel a treacherous material, but when the plates that break are not one in ten thousand of the plates that are made it would be more logical to say that steel is the most trustworthy of all metals, and when a fracture does occur it would be more scientific to say that there must be some unusual cause for it, and to attempt to discover that cause, than simply to charge it to the "total depravity" of steel in general, and say it cannot be prevented.

But after reaching the conclusion that the steel was bad, we are as much in the dark concerning it as before. Why was it bad? and, if bad, why did not the tests show the fact, so that it would have been prevented from going into the boilers? The 40 tests do not of themselves prove that the steel was bad, for steel showing far worse results in the testing machine has repeatedly gone into boilers in the United States, some of it into externally fired boilers on the Ohio River steamboats, licensed to carry 170 pounds steam pressure, bent cold into shells of boilers only 42 inches diameter, rivet-holes punched, and the plates not annealed either before punching or after it, and the boilers presumably in service far more severe than that to which internally fired marine boilers are ever subjected, and yet no explosion, no mysterious fracture, but on the contrary the most complete satisfaction to the owner and user.

The chemical analyses do not reveal the cause of the difficulty, for, while the phosphorus percentage is higher than is now considered proper for the best quality of boiler-plate steel, there are vast quantities of boiler plates in use with a much higher percentage.

Since the data we have concerning these steel plates are not sufficient to enable us to determine with certainty the cause of their failure, we may consider possible causes other than those already cited. The following theories are offered as a possible explanation:

1. The chemical analysis of the steel (supposing it to be correct so far as it goes) is not complete, and the steel may have contained other elements in sufficient quantity which, by themselves or in combination, may have caused the steel to become brittle in service. Elements that may be looked for in this connection are copper, cobalt, nickel, arsenic, tungsten, vanadium and oxide of iron.

2. Want of homogeneity of the steel, due to its imperfect mixture, and especially to the imperfect mixture of the carbon and manganese of the recarburizer with the mass of the molten steel. Such a want of homogeneity, it is not impossible, may take place in the Bessemer process when working with 2½-ton converters. We have not the facts concerning the method of recarburizing adopted in the manufacture of the steel in question, whether the ferromanganese was added in the solid or the liquid state, but in either case it may not have been thoroughly mixed through the mass of metal before cooling of the ingot. If it was added in the solid state, it would be like adding salt to soup; time and stirring are necessary to make a homogeneous mixture. If added in the liquid state, it would be like adding a little molasses to honey; it would take a good deal of shaking to make the two mix thoroughly.

Suppose the metal thus imperfectly mixed were rolled into plates, the defective mixing would appear in the plate as hard spots or streaks throughout the mass, which, on account of their amounting to but a small percentage of the mass, would be likely to escape discovery by ordinary testing-machine methods. Finding hard spots in steel is a matter of not infrequent occurrence with steels higher in carbon than boiler plate, and the reason they are not so often found in low-carbon steel, like boiler plate, is probably that in the latter the amount of recarbonizer used is so small that the chances of finding any portion of it unmixed with the mass are very slight. But how would this want of homogeneity cause the cracking of the boilers after two and one-half years of service? This can only be answered by another theory. Suppose that the want of homogeneity should consist in the plate being formed of successive layers or streaks of different composition; thus one layer might be composed of 0.10 carbon steel, the next a thin streak, microscopically small, of oxide of iron, then another streak of imperfectly diluted ferromanganese containing, say, 1 per cent. carbon and 20 per cent. manganese. Such a mass would have two characteristics, one or both of which might cause gradual disintegration—the first physical, the second chemical:

1. Each of the layers or streaks would have a different rate of expansion and contraction from that of its neighbor. The alternate heating and cooling would cause internal strains in opposite directions, and the continued repetition of these strains would act like the continuous repeated and reverse strains in a car-axle, which, as well known, tend to put a period to its "life." Two and a half years of such service in a boiler might be sufficient to cause molecular disintegration.

2. If such a mass of steel were kept at a red-heat we know from our experience with the phenomena of cementation, case-hardening, annealing in oxides, &c., that the mass would tend to become homogeneous, chemically; in other words, the oxide of iron streak would unite with the carbon in the adjoining streak; the high-carbon streak would tend to lose its carbon, and the low-carbon streak to gain it. The tendency to equalization of carbon in iron and steel is universal. Whenever carbonized iron is heated in presence of oxide of iron the carbon tends to leave the iron; whenever iron is heated in presence of carbon the carbon flows into the iron. This action is more rapid the higher the temperature. May it not be possible that at low temperature, say 300° to 350° F., the temperature of steam in the boiler, the tendency will also become active, and the chemical reactions between oxide of iron and carbonized iron and manganese may go on slowly, requiring, say, years to accomplish what would be done in a week at a red-heat? The probabilities are entirely in favor of such action taking place, and, if it does take place, it is scarcely conceivable that some such phenomenon as "opening of the grain" of steel, which is caused simply by heating, will not take place at the same time.

There are analogies in the various alloys of copper which appear to favor the view that heterogeneity of constitution may lead to disintegration. In the discussion of Professor Egleston's paper at the Montreal meeting in 1879, "The Law of Fatigue and Refreshment of Metals," Vol. viii., p. 398, instances of the disintegration of brass are presented, and similar instances are given in Professor Egleston's paper before the American Society of Mechanical Engineers ("Transactions" American Society of Mechanical Engineers, Vol. v., p. 140). In this latter paper, he says: "Under certain conditions, likely to happen frequently in anything made of iron and steel, the uncombined carbon in iron and steel would be combined and the metal would become brittle. * * * I have seen similar defects not only in iron and steel, but also in copper, tin, brass and in almost every other commercial alloy. * * * Very frequently alloys composed of different metals, when fatigued, would separate, each metal taking its own rate of flow, and separating from the original mass in such a way as frequently to lead to disastrous results. * * * This flow of the metal may be made to take place either by pressure or by heat, and is usually called in the brass works, 'the starting of the zinc.'"

I conclude with a restatement of the theory which seems to me most likely to be the correct one to account for the failure of the steel plates referred to, and hope it will lead to discussion of the question whether it should not be taken as a "working hypothesis" in our future studies of soft steel, at least until it is disproved by an accumulation of facts against it. The most probable cause of the so-called "mysterious failures" of steel boiler plates is not their homogeneity, but their heterogeneity, and the latter is caused by imperfect mixture of the recarburizer with the mass of molten steel before casting.

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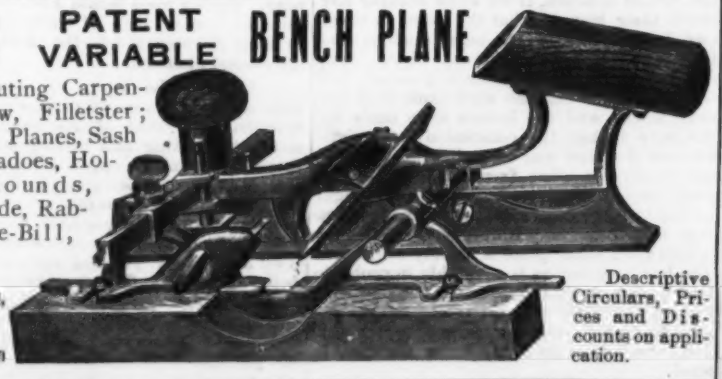

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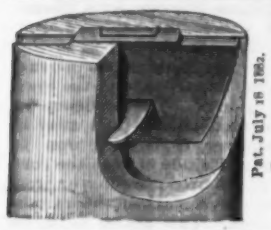

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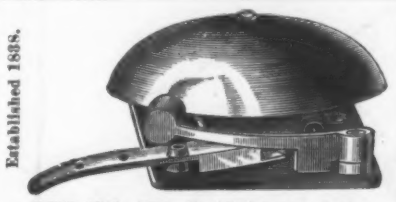

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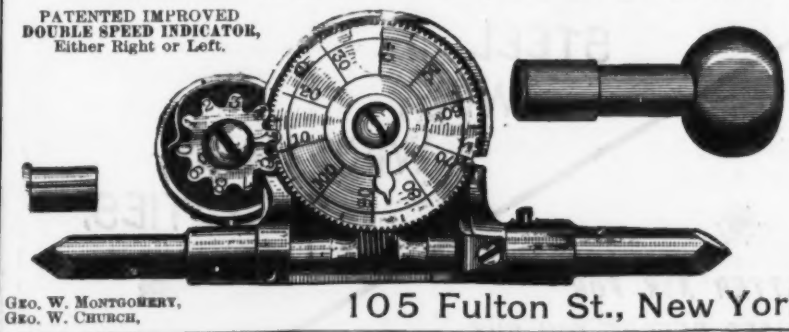

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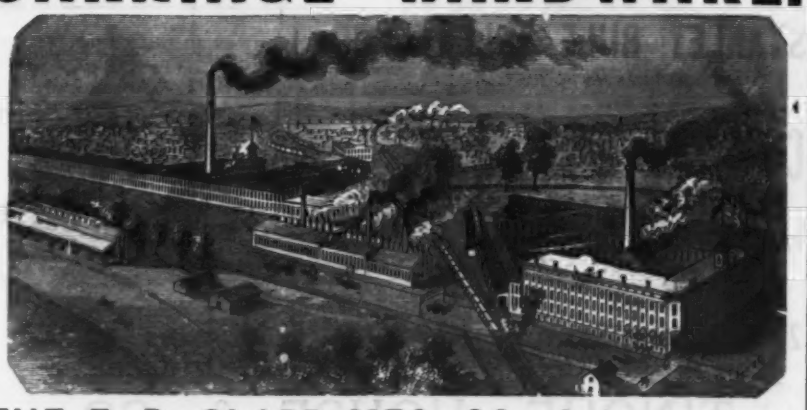

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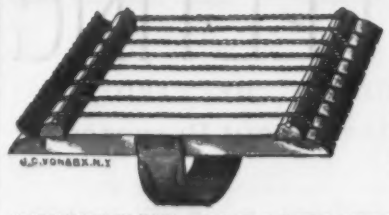

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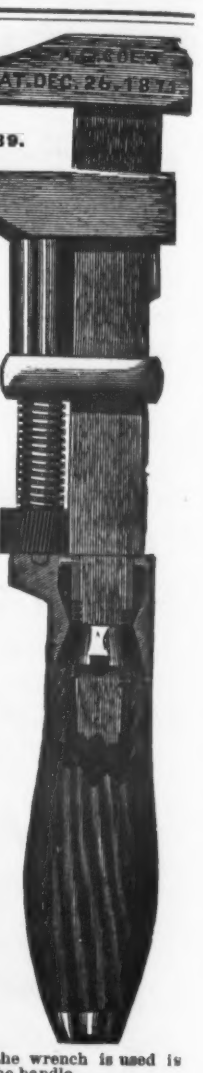

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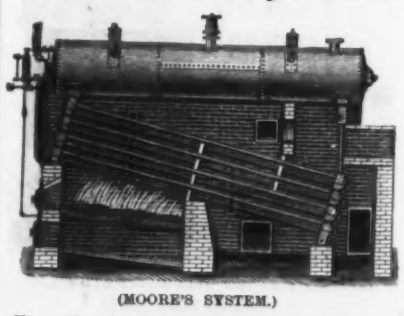

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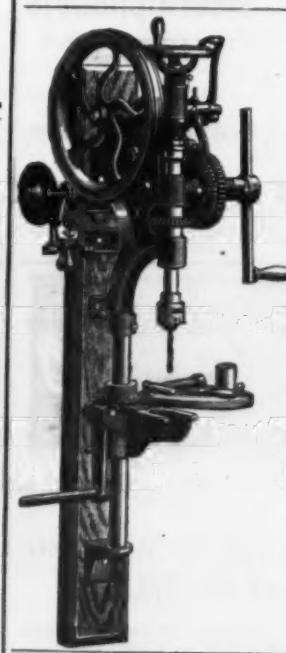

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Soft Steel for Boiler Plate.*

BY ALFRED E. HUNT, PITTSBURGH.

The technical papers of the last few years give very many instances of serious failures by cracking or rupture of soft-steel boiler plates, many of which have satisfactorily passed the rigid inspection and tests required by both Lloyd's Register and the Board of Trade in England. We speak of the inspecting department of Lloyd's Register and the Board of Trade, for we do not begin to have as systematic and intelligent work regularly done in this country as is done by these companies in England. Tension tests of this steel have given from 55,000 to 65,000 pounds per square inch tensile strength, with from 20 to 30 per cent. elongation in 8 inches. Chemical analyses have shown the steel to have had from 0.12 to 0.15 per cent. carbon, from 0.25 to 0.40 per cent. manganese, and from 0.03 to 0.05 per cent. phosphorus. All of these tests are considered normal, and, in words of one of our members, "boiler plates with these qualities ought not to fail," and he for one thinks they ought in such cases of failure to be charged to Providence.

There are, however, several causes of failure in soft-steel plates, which, although the writer does not presume to place as the cause or causes in any particular instance, are still *casus belli* which ought to be guarded against much more carefully than they now are. These causes are: 1. The tempering property of all steel. 2. Insufficient work from the ingot to the finished plates. 3. Temporary fiber in certain steels. 4. Internal strains caused by unequal work upon the material.

On Hardening.—The writer, in a paper read before this Institute in October, 1883, made the statement that soft steel of no matter how low carbon would harden to a certain extent by being heated red hot and plunged into water, and hardened more when plunged into brine and less when quenched in oil, and gave the results of one experiment merely as an illustration of many which had all confirmed the statement made. The illustration was of a heat of open hearth steel made by the writer of 0.15 per cent. carbon and 0.29 per cent. manganese, which gave the following results upon test-pieces from the same ¼-inch thick plate:

	Max. load, lbs. per in.	Elonga'n in 8 in.	Reduction of area.
Unhardened.....	55,000	27 %	62 %
Hardened in water	74,000	25 %	50 %
Hardened in brine.	84,000	22 %	43 %
Hardened in oil....	67,700	26 %	49 %

A similar plate of steel boiler plate made by the writer, of 0.18 per cent. carbon, made higher in carbon in order to get 60,000 pounds per square inch maximum load in ¼-inch thick plates, gave in a ¼-inch thick plate the following results:

	Max. load, lbs. per in.	Elonga'n in 8 in.	Reduction of area.
Unhardened.....	61,570	30 %	60 %
Hardened in water	91,212	25 %	46½ %
Hardened in brine.	99,300	16 %	34 %
Hardened in oil....	90,300	27 %	50 %

Similar results the writer has obtained in quite a number of samples of plates from various manufacturers of boiler plate. While the ductility results of such hardened steel does not decrease to the extent that the increased tenacity would indicate, and are much superior to such results that normal steel of the high tenacity gives, still the greatly increased tenacity indicates that there must be a very considerable molecular change in steel thus hardened, and that if such a hardening should be created locally in a steel plate there must be very dangerous internal strains caused thereby. Such hardening could often occur, especially in marine-work, liable to ship a heavy sea on heated boilers or in incrusted boilers, where a stream of cold feed-water comes suddenly upon locally heated plates, or, forsooth, back at the rolling mill, where the plate has been allowed to be suddenly or unequally cooled after rolling.

Mr. W. Parker, of Lloyd's Register, in a paper read about a year ago, before the Institute of Naval Architects of Great Britain, pointed out the dangers of the use of boiler plate too high in tenacity, on account of the extreme danger of the metal becoming tempered by the heating and cooling to which the plates may become subjected. He said that his "investigations have clearly pointed out that engineers have been drifting toward the use of an unreliable material, or, at all events, a material which is too near the verge of danger to be pleasant with steam boilers," and that he would urge in order to remedy this growing evil that a lower tensile strength be allowed for thick plates, and that a temper test should be insisted upon with every thick plate, and the practice of using such enormously large plates should be discouraged.

On Insufficient Work.—Soft-steel ingots made in the ordinary way for boiler plates have only from 10,000 to 20,000 pounds tensile strength per square inch and an elongation of only 10 per cent. in 8 inches, and a reduction of area of less than 20 per cent. Such ingots properly heated and rolled down from 10 inches in thickness to ½ inch thickness will give from 55,000 to 65,000 pounds tensile strength, and an elongation in 8 inches of from 23 to 33 per cent., and a reduction of area of from 55 to 70 per cent. Any work stopping short of the above reduction in thickness ordinarily yields intermediate results in its tensile tests. All engineers would agree that the steel of the original ingot, with its tensile strength of only 20,000 pounds, would be unfit for boiler plate. Just where the safe limit in the minimum amount of work or reduction in thickness from the ingot to the plate is has not been definitely established in rolling-mill practice; undoubtedly the point varies with different soft steels and is dependent upon the porosity of the ingot and the readiness with which the walls of the blow-holes welled up or at least knit together when compressed. Experiment has, however, proved in so very many instances as to be safe to generalize upon the data that the ordinary boiler-plate steel of the open hearth furnaces of to-day cast into bottom-poured ingots of 10 inches requires to be rolled down to at least ½ inch thickness, and in the majority of cases to ⅜ inch thickness, in order to combine in the tensile tests of the plates the greatest amount of tenacity together with the greatest amount of ductility. Many of the boiler plates of to-day do not get anything like this work, although the practice every year is improving at all the mills a great deal in this respect.

In the writer's experience much of the boiler plate which in the ¼ and ⅜ inch thick shell plates stands 55,000 to 60,000 pounds per square inch tensile strength, in the ⅝ and ¾ inch thick heads of the same steel stands only 46,000 to 50,000 pounds per square inch; and, in order to insure the higher tensile strength in the fixed steel, resort has been taken to a higher carbon metal which runs from the Scylla of the insufficient work to the Charybdis of a metal that will temper dangerously. Mr. Thomas Turner, in writing to the *Engineer* on the subject of Mr. Parker's paper, referred to before, says the only way out of the difficulty of using such high carbon in thick steel plates seems to be for the plate-makers to have machinery capable of working from thicker ingots and dealing with them equally as effectively as with the smaller ones for their plates, thus giving to thick plates the same relative amount of working. He then gives a table of results made by him of his Corngreave open-hearth steel. An ingot of 9 inches thickness was rolled down to 3 inches, a piece of the 3-inch thick plate rolled to 2 inches, the 2-inch plate to 1 inch and the 1-inch plate to ½-inch thick. Test strips were taken of each thickness of this same ingot of steel, with the following results;

	Max. load, lbs. per in.	Elongation in 8 inches.
3-inch thick plate.....	49,490	16.4 %
2-inch thick plate.....	52,416	30.4 %
1⅝-inch thick plate.....	54,656	32.4 %
1-inch thick plate.....	59,360	36.5 %

The writer has held in several instances in his inspecting work that soft steel of less than 50,000 pounds tensile strength is dangerously wrong somewhere, either in the original quality of the metal or in the amount of work that it has been subjected to. It has been contended that steel for heads to boilers cannot be too soft, and that, because of the lower tensile strength of 48,000 pounds per square inch, therefore the metal is necessarily softer than the same metal rolled down to, say, half the thickness, and with a higher tensile strength of 56,000 pounds per square inch with the same or better ductility results. The very common practice of using such insufficiently-worked plates the writer believes to be one of the very dangerous causes of failure in steel boiler plates.

Temporary Fiber.—There have been many instances put on record with both steel and iron of material that works well in the original bar, billet or pipe, but in which just one more working or overheating will render the metal crystalline and very cold-short. In rivet steel this dangerous peculiarity has especially to be guarded against. The writer has had in his experience several lots of rivet rods of steel that chemically seemed to be all that could be asked of them to bend without fracture and give textile tests of 60,000 pounds per square inch, with 25 per cent. elongation in 8 inches and 60 per cent. reduction of area, and yet work them as carefully as may be into rivets and they would become so cold-short and entirely crystalline in character as to be utterly worthless. Just what causes this peculiarity has not been shown, at least to the writer's knowledge. In a case of a similar failure of rivet iron Mr. James Burden, of Troy, some years ago said he had noticed that such results were obtained whenever he used a certain ore in the blast furnace from which the iron was made. Perhaps a similar cause may have caused a like effect in some of the recent "mysterious failures in boiler plates."

Internal Strains.—As has been pointed out, work and flexure and hardening each cause a marked change in the molecular tension of steel. If this action be local, there will be surely dangerous strains taken in the metal, which have often caused it to snap as sharp and decidedly as in the case of a glass lamp chimney in which a like cause has been produced. The following specifications the writer would recommend to be exacted for soft steel for boilers:

Specification for Boiler Plates.—The method of manufacture of the steel for boiler plate shall be distinctly specified in the contract, whether by the open-hearth, Bessemer or crucible processes. The ingots from which the steel plates for boilers are rolled shall be at least 20 times the thickness of the finished plate.

No steel for boiler plates shall be rolled, struck with a hammer or otherwise worked at the black-heat, which is just below the red-heat in daylight, or at a temperature of from 750° to 950° F.

All boiler plate must be tough, soft, ductile and uniform in character, neutral in quality and have a smooth surface and sound edges and a workmanlike finish. It must be free from seams, blisters, buckles, pit-holes, or spots containing clay or other foreign substances that may have been cast in with the steel into the original ingot or rolled into the plates from substances sticking to the hot ingots during the rolling. The plates must be sheared true to size and out of wind, and must have at least ½ inch of scrap sheared off each of the sides and at least 2 inches sheared off at both top and bottom of the plates as rolled from the ingots.

The finished plate must not have a variation of more than 1½ per cent. between the actual and the estimated weight, reckoning the specific gravity of the steel to be, according to Mr. Miller's paper read at this session, 7.8635, which according to our judgment is pretty near correct, or a plate ¼ inch thick and 1 foot square to weigh 10.19 pounds.

Steel for boiler plates shall not contain over — per cent. carbon or — per cent. manganese in plates of under ⅜ inch thick, nor more than — per cent. carbon or — per cent. manganese in plates of over ⅜ inch thickness. Boiler plate steel shall not contain over — per cent. silicon, over — per cent sulphur, nor over — per cent phosphorus.

The percentage to be filled in by contractors in their bids. If drillings of the steel which were taken from any portion of the

* Read before the American Institute of Mining Engineers at the Pittsbugh meeting.

finished material do not satisfactorily answer the chemical requirements guaranteed by the contractor, the steel of the whole charge or blow is to be rejected, unless it shall be proven that the defect was caused by the particular ingot, bloom or plate having been "burned" in heating.

Each plate shall have plainly stamped upon it the maker's name, the guaranteed tensile strength and the cast number, and, after inspection, the inspector's stamp.

At least one of the plates of each different thickness and of each heat as rolled from the ingot and before being cut up into smaller plates shall have test coupons 1¼ inches wide and 36 inches leng attached, but so nearly sheared off as to be easily detached. These coupons shall be stamped with the cast number; they shall also be stamped by the inspector for his identification before being detached from the plates, and they shall then be cut into lengths—one of 16 inches for tensile tests and two of 10 inches each for bending.

Drillings for analyses will be taken under the supervision of the inspector, from the test-strip used for cold bending. Material to be tested shall be of the full thickness of the plate and should be so cut that the sectional area of the strips shall be of at least 0.50 square inch, and, where possible, should be at least 18 inches long, and should be prick-punched lightly in such specimens from end to end into 1-inch divisions on the surface, or preferably on the edge of flat specimens, for the purpose of determining the elongation and marking the place of rupture or other defects in specimen. For such purpose the number of inches shall commence at the top or forward end as the specimen is placed in the testing machine. The bending of specimens may be done in a press or by means of levers or other machines, or by blows of a hammer; however, in the latter case, the hammer blows must not strike upon the steel undergoing the flexure.

Test specimens shall in no case be annealed, heated, hammered, forged or otherwise treated, and shall fairly represent the quality of the material to be tested.

Complete facilities for inspection of material and workmanship must be given by the contractor. Facilities and specimens for testing and the necessary labor shall be furnished by him without charge when called for by the inspector. The acceptance of any plates by the inspector at the mills shall not prevent their subsequent rejection if found defective at the boiler works, or after their further delivery, and any such plates shall be replaced by and at the expense of the contractor.

Plates of under ½ inch thickness shall show in test specimens a tensile strength of not less than 55,000 pounds nor more than 65,000 pounds per square inch, and shall have an elongation of at least 23 per cent. in 8 inches, and a reduction of area of least 55 per cent. and shall have a silky fracture after being pulled apart.

Test specimens of plates (with sheared edges well rounded with a file) of ⅜ inch and under in thickness shall bend cold to an angle of 180° upon themselves without any sign of fracture. Similarly-prepared strips, heated red-hot and plunged into brine or into water at a temperature of less than 80° F., must also bend to an angle of 180° upon themselves without fracture.

Boiler plates of ½ inch and over in thickness shall show in test specimens a tensile strength of not less than 50,000 pounds per square inch nor more than 65,000 pounds per square inch, and shall have an elongation of at least 23 per cent. in 8 inches, and a reduction of area of at least 53 per cent., and shall have a silky fracture after being pulled apart. Test specimens of plates (with sheared edges well rounded with a file) of over ½ inch thickness shall bend to an angle of 180° around a 2-inch pin without showing sign of fracture. Similarly-prepared strips heated to a red-heat and plunged into water at less than 80° F., or into brine, must also bend to an angle of 180° around a 2-inch pin without showing sign of fracture.

Rivet Steel.—All rivets shall be of good quality soft pure steel. All rivet steel shall be capable, without cracking or serious abrasion, of being heated to a good forging heat and made up either by machine or hand work into rivets, and of again being heated to a good, red-heat and forged or pressed into, as in riveting, and allowed to cool, and, upon being nicked and cut out of the work it is in, must show a good, tough fibrous structure, with no crystalline appearance. Rivet steel shall especially be required to be neutral in character and pure in composition, tough and fibrous after riveting, and must flow well in riveting. Rivet steel should not have over 0.15 per cent. carbon, and must not have an ultimate strength of over 60,000 pounds per square inch, and must have an elongation of at least 25 per cent. in 8 inches.

The supply of available timber is rapidly diminishing in all parts of the civilized world. It may be of interest to note a few facts in this connection. The land capable of bearing or actually bearing timber in Sweden has been estimated by Government inspectors at 30,000,000 acres. Down to the present time the Swedish Government has continued to show the greatest solicitude for the preservation of both public and private forests, and minute regulations are in force which, if carried out, cannot fail to make the Swedish forests a source of permanent income. They are not living on their capital there, as some countries have done, and are therefore able to take the utmost advantage of the exceptional conditions which nature has bestowed. In Nova Scotia the approximate amount of timber-producing land was in 1875 computed at 9,000,000 acres; in Ontario, 30,000 square miles; in Quebec, 115,174 square miles; in New Brunswick, less than 10,000 square miles. In British Columbia about 180,000 square miles are covered with lumber. Newfoundland has a large area of forest land. In Natal, Africa, the crown forests have been seriously drawn upon. It is computed that Cape Colony has only between 500 and 600 square miles of forest. Between 1868 and 1878 British Honduras sent out 34,600,000 feet of mahogany. In Victoria, Australia, timber is diminishing at a rapid rate, while in Western Australia the Government will take immediate steps to arrest destruction. In Queensland an annual license fee is exacted from wood-cutters. Tasmania, Van Dieman's Land, has about 8,000,000 acres under timber, of which about 1,000,000 acres are in private hands.

NEW PUBLICATIONS.

TUYERES. Published by Taws & Hartman, Engineers, 1233 to 1237 Front st., Philadelphia, 1886.

We believe that few not directly connected with the design and the management of blast furnaces would believe it possible that so much ingenuity and study have been given to a matter of detail—important, it is true—as is evident from even a cursory examination of the little work before us. Messrs. Taws & Hartman, who are widely known as blast-furnace engineers, are evidently believers in the eloquence of drawings, for they have supplied their monograph so liberally with them. The printed matter which accompanies them is simply the record of their extensive experience, formulated in instructions what to do and what to avoid. They print in all 82 drawings of tuyeres, with principal dimensions recorded; 8 drawings of bronze tuyere breasts, 16 of iron-coil tuyere breasts, and a series of circular notches and cinder blocks. Their monograph will be heartily welcomed by every blast-furnace engineer, who certainly will have no occasion to complain that his own particular tastes and preferences cannot be supplied by one or more of the designs shown.

MODERN ARMOR FOR NATIONAL DEFENSE. By William H. Jaques, Lieutenant United States Navy; Questions of the Day Series, No. 32. G. P. Putnam's Sons, publishers, New York, 1886.

In the popular form which characterizes the "Questions of the Day" series Lieutenant Jaques discusses modern armor at a time when so many in our country are deeply interested in the subject. Mr. Jaques, who has had exceptional opportunities, and has utilized them well, summarizes the present status of information available through foreign sources. He quotes the Gâvre, Ochta and Amager experiments, and the famous Spezia trials of compound and solid steel plates, illustrating the effect of fire by a series of excellent drawings. Mr. Jaques is a strong advocate of the solid-steel plate, which has found its best exponent in the product of the Creusot Works, and from the evidence he adduces, which is well known to students of the subject, it is difficult to escape the same conclusion. It would be folly for us to follow in the wake of the English, with their compound plates, with such a record of recent successes with steel before us.

REPORT OF THE SELECT COMMITTEE ON ORDNANCE AND WAR SHIPS. Forty-ninth Congress, Senate Report 90. Government Printing Office, Washington, D. C. 1886.

In a recent issue we printed the summary of the report of the Senate Committee, and must confess that some of the statements briefly recorded in that document aroused our curiosity concerning the details upon which the conclusions given were based. It was notably the assertion that "in some localities the materials are so closely assembled that the cost of converting them into steel will probably be less than in any other part of the world." We may say at once that there is no testimony so weighty and authoritative in its character as to overshadow the numerous proofs to the contrary scattered throughout the evidence. We believe that it would puzzle the majority of steel-makers in this country to name a single locality which could lay claim to the distinction of being able to "beat the world." In Senate oratory such spread-eagle extravagance may pass, but such statements should not go before the country as an official utterance in cold type.

The appendix, which, by the way, covers 512 pages out of a total of 542 pages, opens with a report by a sub-committee on a visit to England, which goes over ground well covered by technical literature. This is followed by some extracts from the report of the Gun Foundry Board, by a reprint of a report of the British Committee on the Building and Repairs of Ships, dated October, 1884, with copies of contracts and specifications, and a return respecting the ships built and building for the British Navy from 1880 to 1885. This is followed by a very interesting paper on "Naval Torpedo Warfare" by Lieutenant W. H. Jaques, U. S. N., and a paper, illustrated, like the foregoing one, by Lieutenant Jaques, on "Modern Armor for National Defense." In it Mr. Jaques places himself on record as an admirer of the Schneider solid-steel plate, which has shown such wonderful powers of resistance in recent armor-plate trials.

Mr. Albert Williams, Jr., of the United States Geological Survey, contributes a paper on the Bessemer ores and steel works of the United States. He quotes the census figures compiled by Prof. Raphael Pompelly and Bayard S. Putnam, which, so far as we know, have not yet been published by the census, being one of the many undertakings of that bureau which has been allowed to go to sleep. We quote the table below, prefacing it with the remark that it includes only such ores which, smelted alone, would produce pig iron containing not more than ⅛ of 1 per cent. of phosphorus:

State.	Magnetite. Net tons.	Hematite. Net tons.	Limonite. Net tons.	Total. Net tons.	Per ct.
Maine	.....	.....	6,000	6,000	0.28
Michigan	47,800	821,234	80,055	948,589	44.86
Missouri	.....	287,980	.....	287,980	13.60
New Jersey	114,841	.....	.....	114,841	5.43
New York	336,016	.....	24,805	360,821	17.07
N. Carolina	2,750	.....	112	2,862	0.14
Pennsylvania	331,350	.....	49,258	380,608	18.01
Tennessee	.....	.....	5,600	5,600	0.27
Virginia	.....	3,890	2,800	6,160	0.29
Total	832,257	1,112,574	168,630	2,113,461	
Per cent	39.38	52.65	7.97	100.00	

Mr. Williams has secured a statement on the question of Bessemer ores from Messrs. J. M. Swank, F. Witherbee, A. L. Inman, A. S. McCreath and I. P. Pardee. Mr. McCreath states that "there are no ores in Pennsylvania which could be depended upon to yield anything like a permanent or relia-

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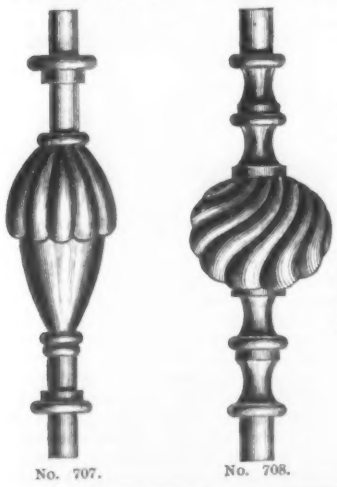

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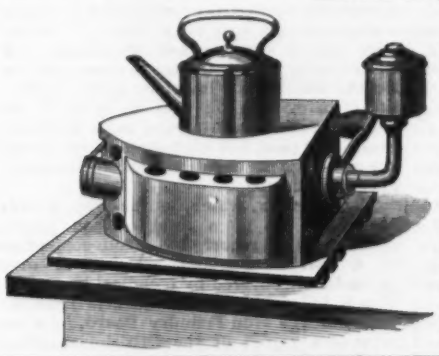

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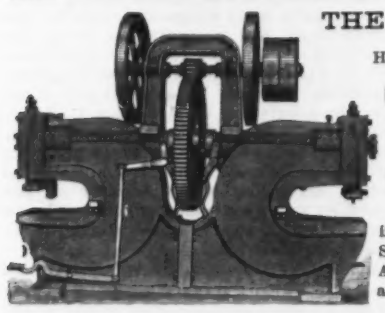

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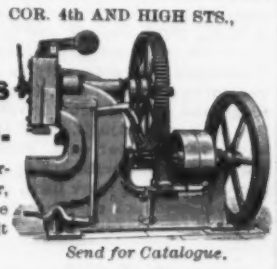

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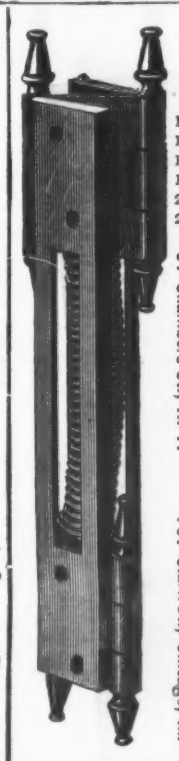

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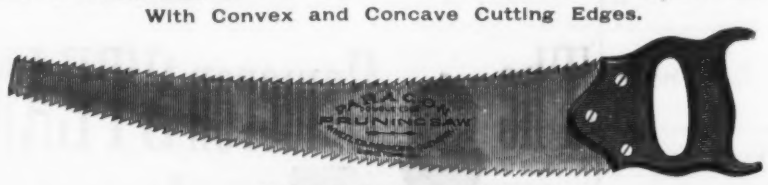

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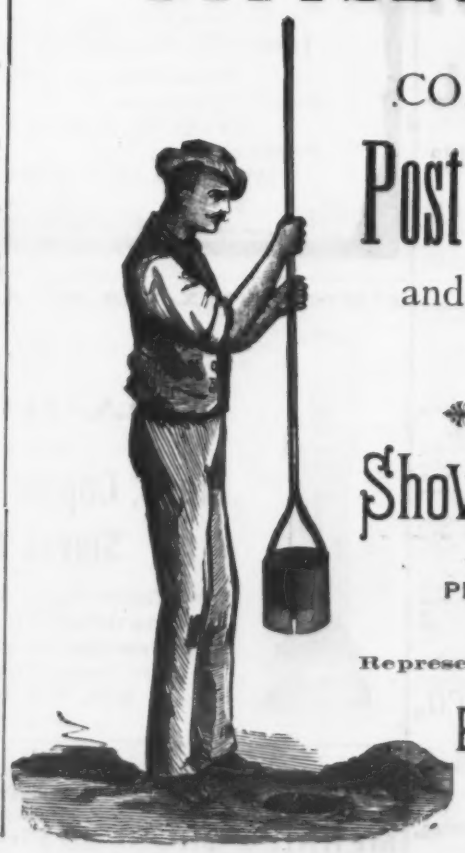

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ble supply for the manufacture of Bessemer pig iron, to be made exclusively from native ores," and Mr. Pardee makes a similarly strong statement concerning New Jersey ores when he says "the little ore that has been mined in New Jersey and used for Bessemer iron has never been used without admixture of foreign ores or ores from other States. The ore, rich in iron, is high in sulphur. There are two or three small veins in New Jersey very low in phosphorus, running sometimes down to 0.014 per cent. phosphorus; but their ores are very lean, and the mines have been abandoned on account of the small percentage of iron." A divergence of opinion is evident from the answers to a question, "Is the importation of ore and spiegel necessary from a metallurgical standpoint, or merely a question of economy?" So far as the weight of evidence goes, American ores of certain classes are as good as foreign ores, and it is only a question of economy. Mr. Alex. H. Sherrerd makes the somewhat startling assertion that importation is neither necessary nor economical, if very slight attention is given to the subject," and when speaking of the relative merits of foreign and imported spiegel commits himself as follows: "It (the American spiegel) can be made just as good by practice. We have energy requisite. Not enough attention has been given to the subject." Mr. Sherrerd should be called upon to explain to those who run the furnaces of the New Jersey Zinc and Iron Co. and the Passaic Zinc Co.'s spiegel furnaces. The metallurgical world has been under the impression that they have been doing exceedingly well under particularly adverse circumstances. The general tenor of the replies of those who use Eastern spiegel is that it is not equal to the best imported material. We imagine that the progress made during the past years has done much to modify the opinions thus expressed.

Mr. F. P. Dewey, curator of metallurgy at the National Museum, gave the committee the benefit of his experience making spiegel at Port Oram, N. J., and at the works of the Roane Iron Co. All that it is necessary to state concerning it is that part of it is historically of some interest, like the crude experiments in the line of the Krupp washing process. Mr. Dewey submits a long line of analyses, which are finally disposed of by the admission that they are from undeveloped properties.

Mr. R. W. Hunt in a short letter advances the opinion that "Bessemer steel can be made more uniform than is possible by the open-hearth process," and this is followed by a very interesting account by Mr. John Fritz, of the Bethlehem Iron Co., on the plant of that concern. Mr. J. Morgan, Jr., of the Cambria Iron Co., deals with the capacity of the works with which he is connected. Mr. Wellman responded for the Otis Iron and Steel Co., and Mr. Bent for the Pennsylvania Steel Co. The balance of the report is made up of statements by leading shipbuilders and others, and altogether it contains a mass of data of great general interest.

New Inventions.

Rolls for forming toe-calk bars have been patented by J. W. Foulks, of Brooklyn, N. Y. The rolls are circumferentially grooved in such a way as to produce a bar of the desired cross-section. The groove in the upper roll has one vertical and one inclined side. The groove in the lower roller is V-shaped and is of about twice the width of the groove in the upper roll. One edge of the lower groove coincides with the vertical edge of the upper groove, while the inclined edge of the upper groove is located opposite to the apex of the V-shaped lower groove. The rolled bar formed by the rolls will therefore have oppositely-inclined sides, with a bi-laterally inclined flange or rib formed along one edge. The bar may be cut to suitable lengths for horseshoe toe calks or for similar purposes. In making a calk the usual spur can be formed at one end by cutting away the greater part of the inclined flange or rib.

J. Pedder, of Pittsburgh, Pa., has patented a rolling mill for rolling metal plates, such as boiler-plates, nail-plates, skelp-plates, iron center or iron back steel, and the like. The mill is constructed with a view of edge-rolling the plates during their reduction, so as to form even edges thereon. The adjustable plate rolls are for this purpose provided with edging grooves at one or both sides of the flat face employed for reducing the ingot bloom or pile to the required width and thickness. In this way the necessity of taking out the work to another set of rolls is overcome, and at the same time the metal heretofore sheared from the side edges is saved. The rolls are provided with collars outside of their housings, in which these edging grooves are formed. In this way deep edging grooves capable of edge-rolling wide sheets without weakening the body of the rolls, where they are subjected to the heavy strain, may be formed.

F. J. Wooster, of Waterbury, Conn., is the patentee of a machine for scouring and drying out sheet metal and particularly sheet brass. The machine is formed essentially of a box or case containing a pair of brushes that revolve in opposite directions. In front of the machine there is a drying-out device consisting of two rubber strips, the distance between which may be adjusted. The box is filled with sawdust, which covers the brushes and the work, so as to absorb what little acid there may be left upon the sheet metal after having passed through the rubber strips. The brushes complete the drying process, and the sheet, after having been subjected to their action, leaves the box through a gate and is wound upon a roller. The sawdust is removed from the sheet by suitable scrapers. This machine is particularly designed to remove the scales or other inequalities which accumulate on the surface of sheet metal during the course of manufacture.

H. St. Lawrence, of Northampton, Mass., has patented a machine for forging pitch-forks, hay-forks, hoes, shovels and analagous articles. It contains a lower fixed and an upper reciprocating die, the latter receiving motion from a shaft carrying the drive-wheel This wheel has a lug adapted to engage a cam on a sliding sleeve that is keyed to the shaft. During each revolution the sleeve turns with its cam face against the rigidly-held end of an upright rod, so that the shoulder on the cam is forced away from the lug. Thus the sleeve and wheel are unclutched from one another and the wheel is allowed to revolve loosely on the shaft. When the operator is ready for another forging he presses a treadle connected with the upright rod, and thereby draws the rod below the sleeve, when the shoulder on the cam is brought within the line of travel of the lug. In this way the desired intermittent action is given to the upper die.

J. H. Brown, of Bay View, Wis., is the inventor of rolls for reducing old rails. The rolls are constructed with a view of breaking down rails, either in small pieces or in full lengths, and in converting them into merchant steel of square-edged flats without showing any seams. Three rolls are intergeared in such a manner that the upper and lower rolls revolve in the same direction, while the intermediate roll revolves in the opposite direction. The upper and lower rolls have circumferential guiding collars of different and diminishing diameters, while the intermediate roll has circumferential guiding grooves of different and diminishing depths. Operative collars and grooves between the guiding collars and grooves for the reception of the rails are everywhere of the same width. The rolls are adapted to convert old rails into wire rods, tires, hoops and bands.

Rolls for rolling girder rails devoid of lower flanges, but provided with a bevel-footed web, have been patented by A. J. Moxham, of Johnstown, Pa. The difficulty to be overcome in rolling this kind of rails is in securing a flow of metal in the head to keep up with the flow in the web. As the metal is rigidly held at the head, any excess of flow in the web can only find its path by forming corrugations. This tendency to corrugate is obviated by shaping the passes so as to cause a proper distribution of work and draft. The main features of the invention, therefore, consist in localizing the excessive irregular draft in the earlier passes, and in causing rapid reduction at the central points of the web. Provision is also made for the displacement of that portion so acted upon to form the bevel foot in the intermediate passes. Heavy draft on the under part of the shoulders of the head in the earlier of the finishing passes, together with lighter draft at the extreme beveled end, is provided.

The Russell & Erwin Mfg. Co., of New Britain, Conn., have patented an improved process of manufacturing wire screw nails. The wire rod is first fed to any ordinary heading mechanism that upsets one end of the rod. The slot is formed in the head while the rod is still within the grasp of the heading dies. To make the slot a small saw is arranged in the machine so as to travel across the head just after the header retreats, and the heading die may be slotted on two sides to permit the saw to pass through it. After the head has been slotted the nail is cut off and the point is formed at one operation by means of combined shearing and swaging dies, thereby producing what is known as the "cut point" of a wire nail. Finally the screw-thread is formed by cutting, swaging or in other ordinary manner. By slotting the head before the head blank is severed from the main rod the necessity of placing the nail in a special slotting machine is avoided.

A machine for winding wire on bobbins or spools in regular tiers or layers has been patented by S. W. Robinson, of Columbus, Ohio. A bobbin-shaft which is capable of being moved axially is provided with a pair of friction stops which co-operate with a rocker placed between the friction stops. The rocker has a friction roll held in contact with the periphery of the bobbin-shaft. An arm on the rocker alternately engages one or the other of the stops and thereby rocks or throws the roll in opposite directions and causes it to be presented obliquely to the bobbin-shaft, thus inducing axial movement thereof in alternate directions. When the axis of the roll is parallel with the axis of the shaft the latter will not be moved axially, but when the roll is presented obliquely to the shaft the latter will be caused to slide in its bearings and to rotate the roll. The path of movement of the oblique roll will be in the form of a helix. The shaft can have a greater or less longitudinal movement in opposite directions by the adjustment of the friction stops.

A machine for reducing the thickness of the walls of metal tubes, so as to roll down and out metal tubes of large caliber, has been patented by S. P. M. Tasker, of Philadelphia, Pa. The machine is so constructed that one of the reducing rolls operates from within the tube and the other from without, while both of the rolls operate at an angle other than a right angle to the longitudinal axis of the tube. The axis of both the rolls are maintained in parallelism. When tubes of considerable thickness are to be rolled it is necessary that the outside or concave roll should rotate more rapidly than the inside or convex roll, to make up for the difference in the paths of the rolls. This can be accomplished either by making the outside roll slightly larger than the inside roll, or by varying the size of the pinions upon the shafts. If desired, two or more pairs of rolls may be employed at the same time and in the same machine, arranged in circumferential series. In this case the operation of rolling can be more quickly performed.

A wire-nail machine to form headed wire nails or rivets from a continuous length of wire has been patented by E. S. Morton, of Plymouth, Mass. Feeding mechanism moves the wire forward intermittently to gripping dies that alternately grasp and release the wire. Cutters sever the wire at a point near the gripping dies, and thus detach the nail. A header or hammer upsets the end of the wire against the gripping dies and forms the head of the nail detached by the next operation of the cutters. The gripping dies are made adjustable toward and from the cutters and header, and means are provided for positively holding the dies in any position to which they may be adjusted. Thus the side of the head formed by the header may be varied, as the distance between the gripping dies and the cutters determines the amount of wire left projecting to be upset into the head.

THE WEEK.

The free-ship bill encounters so much opposition in the Senate that there is no assurance that it can pass.

Richmond, Va., is becoming more important as a commercial center, chiefly on account of more extended railway connections and improved harbor facilities. The value of her exports last year was nearly $3,000,000, and her manufacturing establishments number 685, employing 16,520 hands. The port arrivals last year included 320 seagoing steamers.

The Franco-American Trading Co., of this city, some time ago erected for the canal builders at Panama a number of houses, at a cost of $325,950, and the receiver of the concern now sues to recover nearly $100,000, the balance due, and accordingly obtained from the Supreme Court an attachment against the property of the canal company in this State.

The bill appropriating $585,000 for the work on the New Capitol, at Albany, which has already cost $17,502,993.09, caused a heated debate in the Assembly. Mr. Perry, the New Capitol Commissioner, in 1883 estimated that it would cost the State $3,875,550 to complete the building. But $3,280,000 has already been spent, and now an appropriation of $1,000,000 is asked, and even that amount will not complete the work.

The Atlantic and Pacific Ship Railway—the Eads project—was favorably reported to the House by Mr. Reagan from the Commerce Committee. The Mexican guarantee would be equal to 5 per cent. on $25,000,000, and the United States guarantee to 5 per cent. on $50,000,000. The bill provides that before this guarantee shall become operative the ship railway must have been completed and a vessel of not less than 4000 tons transported across the Isthmus of Tehuantepec to the satisfaction of a board of Government engineers appointed by the President. Tolls on vessels of United States registry are to be 25 per cent. less than those of any other nation except Mexico, and the United States is to name two members of the Board of Directors, Mexico two, and the company five. Not more than $100,000,000 in stocks and bonds are to be issued, and the charges are to be limited to 10 per cent. on that amount.

The owner of an extensive refrigerator works at Fort Worth, Tex., left for England on Friday at the invitation of an English syndicate to perfect arrangements for the delivery of dressed beef to be sent in large quantities to England. A $5,000,000 contract has been made which it will take five years to fill. Refrigerator steamers have been built in England for the transportation of the beef.

One of the important bills pending before the New Jersey Legislature is that for the construction of a ship canal along the line of Mill Creek, in Jersey City. Such a canal will, it is claimed, afford harbor room for vessels of heavy draft, and will, if constructed, be the site of a vast system of commercial storehouses.

The House of Representatives has passed the bill forfeiting the land grant of the Atlantic and Pacific Railroad. This will throw open for public settlement, if approved by the Senate, 28,000,000 acres of land.

The Prussian shipbuilders are doing a brisk business on foreign orders. The principal shipyards show unusual activity.

The paper-trade exports for two years compare as follows, as appears from the statistics of the Treasury Department:

	1884.	1885.
Stationery, except paper	$342,989	$395,123
Paper hangings	84,710	102,018
Writing paper and envelopes	89,932	77,418
All other paper and manuf's of.	755,179	793,057
Totals	$1,272,810	$1,367,616

There is encouragement in the increase indicated.

The authorities of the State of Panama announce that it is the intention of the Government to prevent by all means the clandestine shipping of arms through the isthmus with the object of aiding revolutionary movements against friendly nations in South or Central America.

The House Naval Committee have agreed to recommend the building of two seagoing armored vessels of about 6000 tons displacement, designed for a sea speed of 16 knots an hour, with engines of at least 6000 indicated horse-power, and costing, including engines and machinery and exclusive of armament, not more than $2,500,000 each, and these vessels shall have each a complete torpedo outfit and be armed in the most effective manner; three protected double-bottomed cruisers of not less than 3500 nor more than 5000 tons displacement, to have the highest practicable speed, to cost, excluding armament, not exceeding $1,500,000, and the cost of the three vessels, including engines and machinery, not to exceed $4,000,000; four first-class torpedo-boats, costing in the aggregate not more than $400,000; one torpedo cruiser of about 800 tons displacement, with full torpedo outfit, pars and masts, high power rifle and secondary battery armament, with steel deflective deck, and sea speed of at least 22 knots, to cost complete, excluding armament, not to exceed $300,000, which sum is appropriated. The President is authorized to direct the completion of the double-turreted monitors Puritan, Amphitrite, Monadnock and Terror, for which the sum of $2,000,000 is appropriated. A proviso allowing the purchase of machinery abroad was stricken out.

At the meeting of the American Forestry Congress, held a few months since at Boston, the president, Hon. Warren Higley, in his annual address, made a very strong appeal for the cause in which he is interested. The fact that great evils result from the destruction of forests cannot be denied, but whether public sentiment will be awakened to the danger in time to correct it, before it has grown to greater proportions, is not equally certain. After briefly tracing the history of forests in various countries, the Hon. Mr. Higley makes the following statements as to the necessity of their preservation: 1. That the forest areas exercise a positive climatic influence upon the surrounding country. They modify the extremes of heat and cold, and render the temperature more equable throughout the year. 2. That the deforesting of large areas of hilly and mountainous country affects to a very large extent the quantity of water that comes from springs and flows in rivers. The more apparent is this when the deforesting occurs on the headwaters of important streams. Then the water-power is destroyed or greatly impaired, navigation impeded, commerce interfered with, and droughts and floods are more frequent and more severe. 3. That the interests of agriculture and horticulture are greatly subserved by the proper distribution of forest areas through their climatic and hydrographic influence. 4. That a country embracing within its borders the headwaters of all the streams and rivers that interlace it, when stripped of its forest covering, becomes a barren waste, incapable of supporting man or beast. To those who have not studied the subject the above assertions may seem to exaggerate the importance of forest preservation, but an unprejudiced review of facts cannot fail to show that woodlands have a great influence upon climate and water supply. The subject has, or should have, a deep interest for every one, but, paradoxical as it may seem, it is its very widespread importance which has indirectly kept the public in a state of such comparative ignorance. If the business interests of some small body of men were immediately dependent upon the maintenance of woodlands, the necessary steps would soon be taken to regulate and govern the cutting down of trees. As it is now, forestry laws are advocated from no personally selfish interest, and the public, in consequence, pay little attention to them. The American Forestry Congress is in every way an excellent association, and the work which it has undertaken is deserving of the highest praise.

The United States Senate Commerce Committee report favorably on the bill to bridge the Arthur Kill. It provides that the bridge shall be a pivot draw, with spans of not less than 200 feet and not less than 32 feet above low-water mark. The Secretary of War is to supervise and approve the plans.

Important gold discoveries in Patagonia are reported by E. L. Baker, United States Consul-General to the Argentine Republic.

After an examination of the electric motor in use on a line of street cars in Baltimore the presidents of two St. Louis roads favor its substitution for horse-power One of them reports that the success in Baltimore establishes electricity as the coming motor. The cost of the road is only $7500 per mile.

Jesse W. Starr, founder of the Camden Iron Works, the largest establishment of its kind in the country, died at his residence in Camden, N. J., aged 77 years.

Real estate in New York during the last month was remarkably active, being sought for investment.

Contracts and reports on file with the Railroad Commissioner show that the Union Pacific Co. have paid to the Pacific Mail Steamship Co., under the contracts now in force, the sum of $1,807,047, in consideration of which the steamship company have diverted all of their inland and Atlantic Coast freight and passenger business over the Union Pacific road. By the same means it is shown that the Central Pacific Co. have paid the steamship company in the same time and for the same purpose the sum of $2,233,362, making a total of $4,040,409. The Government asks the railroad companies to show cause why 25 per cent. of this amount, which the railroad companies have treated as "operating expenses," should not be paid, under the provisions of the Thurman act, to the Government.

The success of the natural-gas industry in Western Pennsylvania, Western New York and some parts of Ohio has greatly reduced the cost of fuel, and in some cases also of light, and threatens the future of the oil trade by supplanting it in some measure as an illuminator on the one hand and occasioning a possible overproduction on the other by inducing the drilling of an extraordinary number of wells. The first successful attempt to use gas outside the oil region in any very considerable quantity was by laying a pipe line from the Butler district in Pennsylvania to the iron works and oil refineries near Pittsburgh. The result is that Jamestown, Buffalo and Elmira, N. Y., Erie, Meadville, Newcastle, Pittsburgh, Beaver Falls, &c., in Pennsylvania, and many small manufacturing cities in Eastern and Northwestern Ohio, are now being or soon will be supplied with this natural and very convenient fuel.

Secretary Manning, in a letter received by the Senate Undervaluation Committee, condemns increased penalties for undervaluations, where no fraud is alleged, as unfair and inexpedient—a virtual confiscation of property where no wrongdoing is charged and no trial granted. A larger, better and more capable appraising force at New York is urged. An extension of the present system of consular invoices is opposed, as the existing methods are productive of unsatisfactory results. The impossibility of harmonizing appraisements at different ports under an ad valorem system is declared. The Secretary opposes a return to a system of rewards for informers, &c., and says if such is to be revived the law of 1799 should be re-established. The subject of the burden of proof of fraud, &c., was, in his opinion, best regulated by the laws of 1799 and 1830. He urges the passage of the bill drafted by him in reference to protests and appeals. Of the present situation he says the chief cause of condemnation is as to consigned merchandise at the port of New York paying ad valorem rates. No abuses in ascertaining and reporting quantities are known to exist. The Secretary inquires whether the consignment system is not the natural and orderly development of international intercourse, quick transportation and commercial progress.

President Henry Morton, of the Stevens Institute of Technology, Hoboken, N. J., has been appointed to fill the vacancy in the Board of Trustees of that institution caused by the death of Wm. M. Shippen.

Senator Frye's bill directs the President to invite delegates from all the Republics of Central and South America to convene in Washington, December 1, 1886. In an interview Mr. Frye said that the object of this bill, as was shown in its several sections, was to bring the nations of the American hemisphere into closer political and commercial relations. He believed that a convention could be entered into under which the good offices of this Government could be exercised so as to preserve the peace and encourage the development of the nations that have been formed upon the model of our own and are striving to imitate us in all of the features of our national greatness. It was the duty of the United States, as the mother of republics and the most powerful of the American nations, to take the lead in measures that would result in the permanent good of all. If 20 or more of the leading men of each of the Spanish-American Republics could be brought to the United States as the guests of this Government, and made familiar with the advanced civilization of this country, with our industrial development, political and educational progress and the economic conditions of our people, it would be to their advantage and to our own. One great obstacle to the extension of our trade among the Spanish-American nations was their ignorance of us and our ignorance of them, and he believed an increased commerce would naturally follow a more intimate acquaintance. Commercial intimacy is a natural and necessary result of close friendly relations, and the extension of our markets upon this hemisphere was the most important problem that now confronted the American people.

A device has been brought forward for protecting water-pipes against freezing, the arrangement being based upon the fact that water in motion will remain liquid at a lower temperature than water at rest. One end of a copper rod placed outside of the building is secured to a bracket and the other arm is attached to one end of a weighted elbow lever; to the other arm of the lever is secured a rod which passes into the building and operates a valve in the water-pipe. By means of turn-buckles the length of the copper rod can be adjusted so that before the temperature reaches the point at which there would be danger of the water in the pipes freezing the valve will be opened to allow a flow of water; beyond this point the valve opening will increase and the flow become more rapid as the cold becomes more intense, and as the temperature rises the valve is closed. This plan sets up a current in the pipes, which replaces the water as it grows cold by the warmer water from the main. Whether the valve be opened or closed, the service-pipes are always in working order.

Samuel Guthrie was last week appointed deputy collector in the New York Custom House, in place of William Barre, who resigned on December 31 to become deputy of Brooklyn. Mr. Guthrie is a well-known New York merchant, and head of the old house of Samuel Guthrie's Sons, importers and exporters of leaf tobacco and traders to South America.

J. H. Walker, in an address on the perils of wage-workers, shows conclusively that the periods of cheap money and inflation were detrimental to their interests. He says: "While wages slowly increased from 1861 in the number of dollars paid the workman, their purchasing power—the value of their wages measured by what they could buy—just as surely decreased. In 1860 the wages of a dyer were 67 cents a day; the total cost of food supply for a year was $225. In 1864 his wages were $1 per day; total cost of same food and supplies, $441.61. By this it will be seen that the purchasing power of his dollar in 1864 was 50 cents, against 67 cents in 1860. In 1860 plain weavers were paid 72 cents per day; in 1864, $1.08. They could only buy with the $1.08 what they could buy with 55 cents in 1860. It took nearly 18 years before their wages were worth as much as in 1860. To-day their wages are worth one-sixth more than in 1860, with a greater purchasing power. It took six years for carpenters' wages to have the same purchasing power as in 1860. Machinists who were paid $2 in 1860 and $2.50 in 1864 could only buy with their $2.50 what they could buy with $1.27½ in 1860. It was eight years before their wages were worth to them as much as in 1860. To-day their wages are worth one-eighth more than in 1860. Locomotive engineers were paid $2.40 in 1860 and $2.80 in 1864, but the $2.80 would only buy as much as $1.42½ in 1860. It was 10 years before their wages were worth as much as in 1860. To-day their wages are one-third more than in 1860." He says: "The wages of every class the country over show substantially the same thing." It took in every instance from six to eight years for the wages to equal in purchasing power those of 1860. Those years between 1860 and 1870 were the years of inflation and cheap money.

The Central Combustion Co., in September, 1882, made for Cassius H. Reed and Edward S. Stokes two boilers, to be used in heating the Hoffman House. The vice-president of the company, Edward J. Mallett, and inventor of the specialties for which these boilers were famous, agreed in a written guarantee that if the boilers, after a test of 60 days, were not satisfactory he would pay to Reed & Stokes $10,000. The boilers were subsequently, it was said, found to be defective, and the hotel proprietors replaced them with others. The amount mentioned in the guarantee was refused to be paid, and an action was brought to recover it by Reed & Stokes. The case had been on trial before Judge Freedman and a jury, when a verdict was rendered on Friday for the plaintiffs for the full amount claimed, and the court granted an extra allowance of 5 per cent. for costs.

The engine-house and shops of the Rusk Penitentiary, in Texas, were burned February 26, destroying machinery and materials valued at $75,000. The contract for supplying the State Capitol with ironwork will not be interfered with.

A petition in favor of the repeal of the Bland act was presented by Mr. Hewitt to the House of Representatives, signed by the presidents and cashiers of all the savings banks in the State of New York, and representing more than 1,000,000 depositors whose savings amount to $437,000,000. The petitioners say: "To make our securities, principal and interest, payable in silver dollars, and thereby to reduce the exchange value of the savings of the people by 20 per centum, would be a loss of purchasing power of the funds in the savings banks of New York State alone equivalent to a shrinkage in value of nearly $100,000,000; and that, as the value of the currency would be alike impaired, whether in the savings banks or elsewhere, the vast sum would represent only a small portion of that loss to be apprehended from the continued compulsory coinage of the standard silver dollars, the greater portion of which loss must be borne by the industrial classes whose interests we serve."

The echo fog signal of De la Torre, of Baltimore, was tested near Fort Carroll last week by officers appointed by the Navy Department. The outfit of De la Torre consisted of a single-barrel breech-loading gun, on the muzzle of which he pushed a funnel—giving it the appearance of an old-time blunderbuss—a box of cartridges and a tripod. Fort Carroll was the first object brought under fire, at a range of about ½ mile. Promptly on the discharge of the gun with the trumpet-like muzzle the echo came back to those on the tug and was heard distinctly without the aid of the receiver. When a boat came in between the fort and tug at the time of firing, two echoes were distinctly heard, the fainter one being from the intervening vessel. De la Torre explained that in favorable weather he had heard the echo with the unassisted ear 4 miles. The commission will report favorably on the invention and advise more extended experiments.

The United States Pneumatic Co. have been incorporated to "manufacture and prepare compressed air or other elastic and motor fluids for use as a power and the regulation of temperature, and to furnish and supply the same to persons, firms and corporations; to purchase, construct and lay reservoirs, pipes, mains and conduits for the storage and conveyance." The capital stock is $2,000,000, divided into 20,000 shares. The trustees are James G. Smith, Calvin A. Poage, W. A. Dunn and Frederick C. Ross, of this city, and Orestes Cleveland, of Jersey City.

Sixteen carloads of raw silk from Yokohama via San Francisco arrived in this city on Friday over the New York Central road. The silk was packed in sealed bales of about 150 pounds. The value of the goods was $5 a pound, or more than $1,600,000, and the freight upon the cargo from Yokohama to New York was 8 cents a pound, or more than $26,000.

The long litigation in the suit of the New England Iron Co. against the Gilbert Elevated Railway Co. has been stopped at last by an agreement on the part of the Metropolitan Elevated Railway, formerly the Gilbert, to permit the plaintiff to take judgment against it in $250,000.

A cotton harvester, designed to dispense with hand labor in picking cotton, was exhibited in the New York Cotton Exchange and pronounced a valuable invention.

Col. William Ludlow, the retiring chief engineer of the Water Department of Philadelphia, is credited with a saving of $750,000 during the three years of his administration. Besides the new Spring Garden station, two new 15,000,000-gallon engines have been placed there. One 10,000,000-gallon engine was put in the Frankford pumping station and one 7,500,000-gallon engine at Roxborough. The financial results are regarded with satisfaction. The following table shows the quantity and cost of pumpage:

Year.	Total pumpage.	Pr. ct. of increase.	Cost.	Pr. ct. of decrease.
1882	24,691,440,480	0.00	$252,360	0.00
1883	25,284,957,251	2.44	246,914	2.16
1884	25,496,179,353	3.25	215,896	14.45
1885	25,165,030,072	1.92	185,141	26.64

Although more water was pumped in 1885 than in 1883, the work was done at a much less cost. Yet the percentage of increase of pumpage is lower in 1885 than in 1883.

The value of the Broadway Surface Railroad franchise is variously estimated, but is supposed to be something like $6,000,000 to the persons who secured it, including the enhanced value of the Seventh Avenue Railroad shares held by them. The State Legislature in both branches manifests a decided disposition to revoke the charter by instructing the Attorney-General to that effect. Section 48 of the General Railroad act of 1850 declares that the Legislature "may at any time annul or dissolve any incorporation formed under this act," and the first section of the General Surface Railroad act of 1884 makes any corporation formed under it subject to all the liabilities imposed by the act of 1850.

The special committee of the New York Legislature to investigate the Consolidated Gas Co. report that they find nothing illegal in the organization.

Silk manufacture in Pennsylvania is fast growing in importance. In Philadelphia alone there are nearly a hundred mills spinning and weaving silk and silk-mixed goods, and employing about 8000 persons. Plushes and velvets have recently been added, and there are two mills on dress goods. The recent advance in the price of raw silk has not checked, but has rather stimulated, the industry, and the outlook for the current year is better than ever before.

M. Armand Rousseau, the eminent French engineer who accompanied the French commission to Panama to report to his Government respecting the progress of work on the canal, is reserved in the expression of his opinion, but, according to a correspondent on the spot, "it is not at all unlikely that the report will lead the French Government to grant the canal company the assistance for which its chief has applied, viz., pemission to issue a lottery loan for the amount of 600,000,000 francs. Nobody here supposes that amount will finish a tide-level canal, but it will enable the company to do so much work that the world will not allow the enterprise to fail. It is among the possibilities that the original plans will be changed, and that instead of a canal at tide level the lock system may be adopted."

A steel floating derrick capable of lifting 80 tons has been taken to Brooklyn from Wilmington, Del.

Wm. K. Vanderbilt's new steel steam yacht, now under contract with Harlan & Hollingsworth, at Wilmington, Del., will be the queen of the American fleet in size. Her length will be 285 feet over and 252 on the load water line, while Mr. Astor's Nourmahal, hitherto the largest, is but 233 feet over all and 221 on the water line. The new yacht will be 32 feet wide, 21 feet deep, and will draw 17 feet of water, while the Nourmahal is 30 feet wide, 18.7½ feet deep, and draws 14.3 feet of water. Mr. Astor's yacht measures 1264 tons and Mr. Vanderbilt's 1311. The size of these big pleasure ships may be better understood when it is said that the famous clipper packet Dreadnought measured only a little over 1100 tons, and she carried from 300 to 400 passengers on a passage, besides 1600 tons of freight. The engine will be of the compound surface condensing type, having three cylinders and three cranks. It is of the same style and type of marine engine as that of the Cunard steamships Etruria and Aurania. The diameter of the high-pressure cylinder is 32 inches, that of the low-pressure 45 inches, and the stroke of piston will be 3 feet 6 inches. The propelling power will be delivered from a four-bladed screw propeller-wheel cast out of phosphor-bronze metal. Her estimated average speed at sea is 13½ knots per hour.

The exports of California wine in 1885 make a total of nearly 4,500,000 gallons, or about 1,000,000 gallons more than in 1884.

A. F. PIKE MFG. CO.,

PIKE STATION, GRAFTON CO., N. H., U. S. A.,

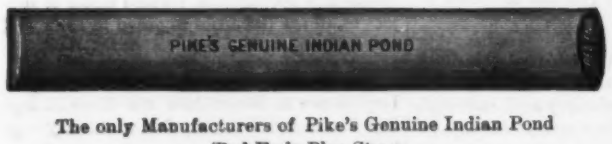
The World's Headquarters for all kinds of

SCYTHE STONES, OIL AND WATER STONES, RAZOR HONES, ETC.

SCYTHE STONES.

OIL STONES.

We have Scythe Stones from almost every reliable Quarry in the World.



The only Manufacturers of Pike's Genuine Indian Pond (Red End) Blue Stone.

Pike's Black Diamond.

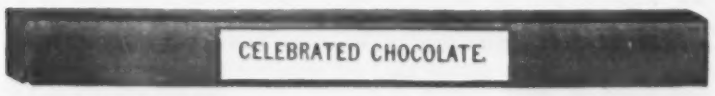
Pike's Genuine Lamoille Blue Stone.

Pike's Genuine Ragg, 9 and 10 inch, and Genuine Ragg, No 2.

Axe Bitts from any kind of Grit and of any shape desired.

Genuine Imported Cigar Shape Emery.

We make Hacker Stones from Hindostan, Vermont and other Grits, and can supply from the cheapest second quality to the choicest, all white, perfect stone.



The celebrated Chocolate Stone, from the Lisbon Quarries, made in all shapes, for Scythes, Carpenters' and Shoemakers' use.

OIL STONES.

Washita, Arkansas, Turkey, Hindostan, Orange, Chocolate, Scotch, Labrador and other Grits in every shape required.

All of Pike's Washita and Arkansas Oil Stone are from the celebrated Quarries at Hot Springs, Ark. We can supply the rough or finished stock.

Regular Slips are made from all the various Grits; also special sizes of Slips, Files, Diamonds, Triangular, &c., &c.

Mounted Stones of various Grits in Mahogany or Black Walnut Cases, as desired.

Hindostan and Sandstone are from Indiana. We have a warehouse at Orleans, and can make prompt shipments, as we usually have a large stock of both kinds on hand.

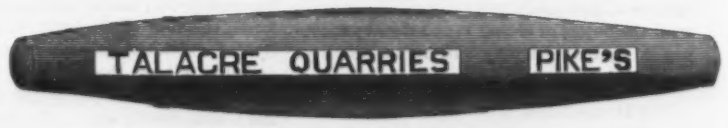
We import large quantities of Belgian, Italian and German Razor Hones, and believe we can supply the Trade at lowest prices and satisfactory quality.

Pike's Green Mountain.

Darby Creek pattern of Genuine New Hampshire, Vermont, Ohio and Michigan Grit.

Pike's Mowing Machine Stone, No. 1 and No. 2.

Emery Table Hones; also an excellent Knife Sharpener, from choice Grit Stones, of about same shape as the Table Hone.



Genuine Sir Pyers Mostyn's Talacre, and Ohio Round English, 9½ and 12 inch.

Pike's German Pattern of Genuine Indian Pond and Lamoille Grits.

Gritty and Diamond Pearl Scythe Stones are a fine, soft, free-cutting Grit, of a Pearlish-White color.

Agents: **JOHN H. GRAHAM & CO.,** 113 CHAMBERS ST., NEW YORK, AND **WM. PICKETT & SON.,** 164 LAKE ST., CHICAGO, ILL.

SEND FOR CATALOGUE AND PRICE LIST.

MECHANICAL.

Influence of Stoking.

How much the results obtained from some boilers can differ was shown by some stoking competitions held last year by the Magdeburg Steam Boiler Association, Germany. Only firemen who had had several years' practical experience were admitted to the competition, and its conditions were fully explained, and the fuel, boiler and setting shown to them. Each stoker fired a whole day, the water level and steam pressure being brought to the same point before commencing, and the fuel and feed-water weighed. The boiler was a new patent one—apparently no improvement on known types—with a disproportionate amount of outer brick surface; the grate was rather too large for coal and too small for lignite, having been made so on purpose to see how the different men would deal with somewhat difficult conditions. We do not reproduce the tabulated results, but confine ourselves to stating that the evaporation obtained per pound of coal by 11 stokers varied from 6.89 pounds to 4 pounds of water, and with the lignite from 2.32 pounds to 0 95 pound, being a difference of 44 and 65 per cent. respectively. The quantities evaporated per unit of heating surface per hour also differed by 25 per cent. with coal, and by 50 per cent. with lignite, and the greater evaporation per square foot of heating surface did not, as might be supposed, correspond to the lesser evaporation per pound of fuel. Such differences are startling in the highest degree, and exceed anything a boiler-maker ever professed to gain by his patent construction or setting. The results would probably have been more uniform if the boiler had been one to which the men were accustomed. But there can be no doubt that, even in that case, the differences would have been considerable. Even men who do well with one form of boiler fail when put to another kind, and the inferior results obtained from some boilers compared with others are probably attributable in a great measure to this cause.

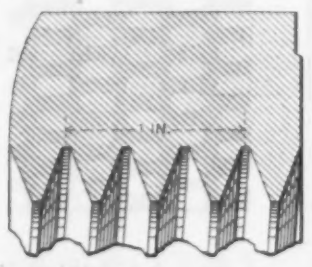
An Instantaneous Boiler.

M. Lestang describes, in the *Revue Industrielle*, a so-called "instantaneous boiler," devised by M. Buisson. It is admitted that this problem has received considerable attention, but with not very satisfactory results. M. Buisson's arrangement consists of one or more steel cylinders, closed at one end and covered at the other by a lid secured by six screws, and pierced with three holes. These vaporizers are from 20 to 36 inches long, and from 4½ to 9 inches in diameter. They are intended to be filled with material called by the inventors "metallic sponge," but consisting simply of small grains of iron coppered in order to prevent waste by the steam. Through one of the holes in the cover a copper tube descends nearly to the bottom of the cylinder, where it terminates in a capillary opening. The steam-outlet pipe is connected with another of the holes, the third hole being for charging the cylinder with granular material. The cylinder thus charged is placed in any convenient furnace for making it red-hot. Water is then injected into it by means of a pump, and high-pressure steam is instantly generated. There are means of regulation by which the quantity of water injected, and consequently of steam generated, depends upon the demands on the engine. It will be seen that this system of steam-raising is primarily intended for the class of domestic motors, an essential feature of which is that the boiler must not be liable to explosion or to injury by neglect in supplying water or by overfiring.

Cas -Hardened Nuts and U. S. S. Threads.

Mr. H. S. Brown, of the Delamater Iron Works, New York, sends us the following letter on the subject of case-hardened nuts and U. S. S. threads:

I have been connected with a number of engine shops and other machinery establishments, and have yet to get into the first one that has not had an endless amount of trouble arising from misfit nuts and bolts used on their work. In some shops the cause is attributed to case-hardened nuts; others say it is caused by wear of taps and dies in the shops where the nuts are manufactured, still others will say the cause is in the tapping of the holes or the cutting of the studs or bolts, &c. I think that there is ground for saying that these are points well taken with some manufacturers, but when we go to a house of high reputation, who deal only in first-class goods, and get into this trouble, then I think there is something else at fault and that something I propose to deal with here. Suppose we go to a machinery shop and order a box of hardened nuts, positively stating that we want nothing but U. S. S. threads—*i. e.*, ½-inch, 13 threads; ⅝ inch, 11; ¾-inch, 10, &c. Then we go to a manufacturer of taps and dies and say we want a set of taps, U. S. S. threads. We count the threads and find them the same as those in the nuts, 13, 11, 10, &c. Then we go to our shop to see if we can get over this misfit busines. We cut some studs, take out our new taps, tap our holes and get a very large wrench with which to screw in the studs, but to our horror they go in by hand.



Misfit Nuts and Bolts.—Fig. 1.—Section of Nut Tapped with U. S. S. Tap.

This is no imaginary affair, but is taking place daily in some of our best shops. Let us see where the trouble is. To illustrate plainly, we will take a bolt whose diameter shall be 4 inches, and the number of threads per inch, three. A nut tapped with a U. S. S. tap will show in section like Fig. 1, the top and bottom of the threads being flat one eighth of the depth of the thread. Let us now cut a screw or stud with the same outside diameter, and the same number of threads, with what is termed the "V" thread, and we get the result shown on an enlarged scale in Fig. 2. The full lines show the U. S. S. thread and the dotted lines the V thread, and the distance *k* represents the misfit in the nut and bolt. In other words, it is equal to one-eighth of the depth of the thread. A great many mechanics as well as some of the manufacturers fail to understand this difference in the two threads; hence the cause of the trouble.

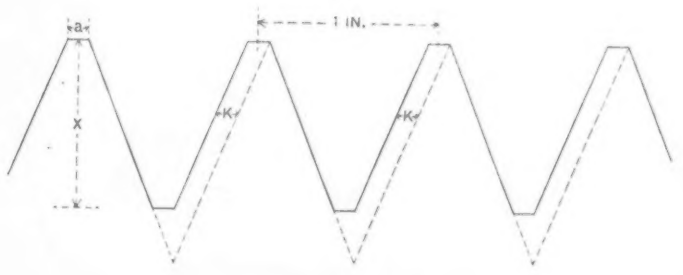
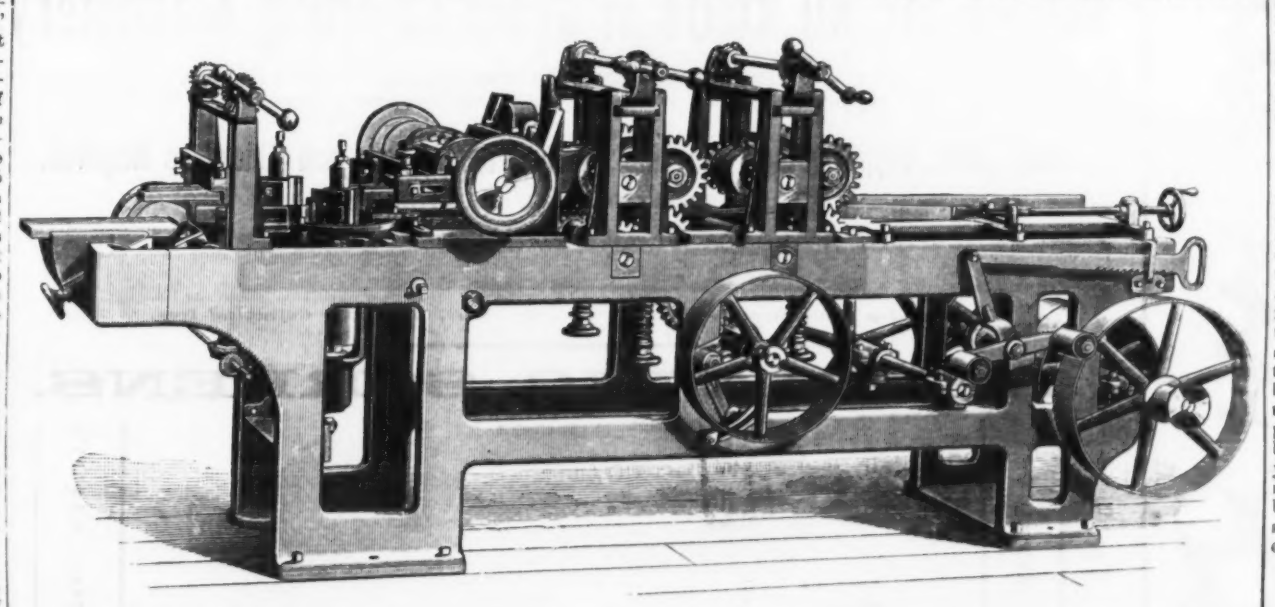


Fig. 2.—Diagram Showing V-Thread for a Screw.

A New 10-Inch Inside Molder.

Messrs. C. B. Rogers & Co., of Norwich Conn., are now building a new 10-inch inside molder, shown in the annexed illustration. It is a radical change from other molders of their make, and possesses some new features that will recommend it to every practical operator. It is arranged to work 10 inches wide and 6 inches thick, with all necessary adjustments for sticking moldings of every style, also flooring and ceiling. The top and bottom cylinders are made from solid crucible steel forgings, head and journals in one piece, and are slotted on four sides. The pulleys are provided with a large flange which acts both as a balance-wheel to carry the cylinder through a heavy cut and as a convenient means of turning the cylinder when setting the cutters. The top cylinder is adjustable endwise across the machine, effecting a great saving of time in setting molding cutters. The lower cylinder is raised and lowered to any desired position in the same manner as the top one. Boxes for both top and bottom heads are connected in yoke form to avoid any cramping. The side spindles are moved to any desired position across the bed by means of screws, and both spindles can be tipped to work at an angle. All bonnets, chip-breakers and pressure bars are arranged to swing clear of the cutters in the heaviest work, and may be thrown back or removed entirely when setting or sharpening knives.

The opening in the bed for the lower cylinder may be enlarged or diminished at pleasure, and the entire end of the frame can be swung off to one side, giving free access to the lower cylinder. The feed is very powerful; rolls are geared at both ends, and feed-roll shafts arranged so that wide rolls can be removed and narrow or spur rolls substituted without loss of time. The feed may be set at any speed desired. The tight and loose pulleys on the counter-shaft are 10 x 6, and should make 1000 revolutions per minute. Belting required: 46 feet of 3½-inch for top and bottom cylinders; 40 feet of 3-inch for side heads and feed. The New York office of Messrs. Rogers & Co. is at 109 Liberty street.



NEW TEN-INCH INSIDE MOLDER, BUILT BY MESSRS C. B. ROGERS & CO., NORWICH, CONN.

Rotary Engines.

There is no reason to believe that rotary engines are now nearer success than they were half a century ago. In an article which we reprint below the London *Engineer* attempts to explain the reason why, and, as our contemporary's acquaintance with rotary engines as they have existed in metal and on paper is extensive, the remarks may be regarded as the outcome of practical knowledge of the subject:

It will be found that almost without exception inventors of rotary engines have attempted to run their engines at a very high velocity. One of the advantages which they always claim is that the rotary engine is not only smaller, but very much smaller, than any other engine of the same power. This is the principal reason why rotary engines have not been successful. In a word, the principle on which they have been constructed has been wrong. A great point in the rotary engine is that the continuous motion of the piston permits it to be run at a very high velocity, but, inasmuch as the diameter of the circle described has always been small, the high piston speed has been accomplished by a high velocity of rotation. This would be of no consequence were it not that there must be a reciprocating member in every rotary engine, and to work a stop or abutment at 500 or 1000 strokes per minute is as bad, or worse, as to work a piston and crank-shaft at the same rate. The proper way to construct a rotary engine is to make the piston move through a large circle at a moderate speed of rotation. This has never been tried in practice. Until it is no really successful rotary engine will be constructed.

To ilustrate our meaning we append a sketch. The center or body consists of a disk, A. To this is joined a piston, B, shown in cross section in Fig. 2. An abutment is moved in and out by suitable mechanism. The piston revolves in a ring, D. Inside this is a continuous slot in which A revolves, steam tight, by means of two packing rings, as shown in Fig. 2. Of course it will be understood that this is a purely ideal sketch. Let us assume now that the diameter of the ring is 20 feet, its width 24 inches and the depth of the piston, measured radially, 3 inches; the area of the piston will be 24 × 3 = 72 square inches. The circumference of the circle described by the piston will be, omitting fractions, 62 feet. Let the revolutions be 60 per minute, then 60 × 62 = 3720 feet per minute. Let the average pressure be 50 pounds per square inch, then $\frac{3720 \times 72 \times 50}{33{,}000}$ = 406 horse-power. The space occupied by such an engine would not greatly exceed that filled by the fly-wheel alone of an ordinary horizontal engine of like power. The design, too, is one of the most convenient that could be adopted, for the engine would stand against the wall Smaller machines might, indeed, be bolted to a wall and have their axes coupled to a line of shafting by a universal or other flexible joint. The travel of the abutment would be very small—only 3 inches. It will be seen almost at a glance that this engine, so far as size and shape are concerned, has everything to recommend it. At sea, for instance, the saving of space and of weight secured by its adoption would be enormous.

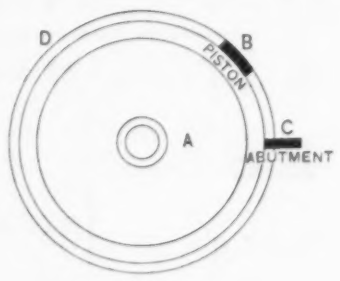


Fig. 1.

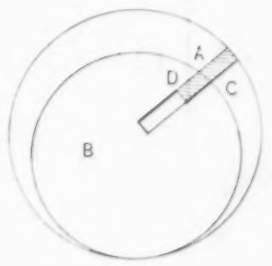


Fig. 4.

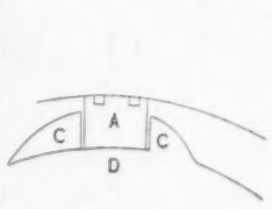


Fig. 3.

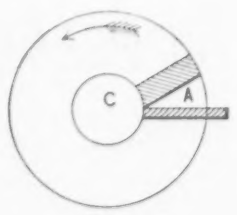


Fig. 5.

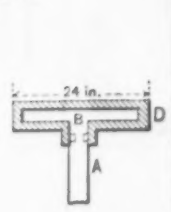


Fig. 2.

ROTARY ENGINES.

Next let us consider what are the objections to be urged against it. In the first place, as it would be practically impossible to keep the center of the main axis in the center of the ring cylinder, the piston must be secured by some flexible device to the disk. This may be done in various ways, as for example, that shown in Fig. 3. Here the piston is dropped, so to speak, into a notch in the edge of the center disk, the sides of which notch are shown by C C. There are, of course, obvious objections to such a plan, but it provides a remedy for the difficulty which we have raised, and equivalent, but really practical, devices will readily suggest themselves.

A piston moving at 3700 feet per minute will, if it works with any friction, absorb a great deal of power; on the other hand, its leakage at such a velocity will be insignificant. It is for inventors to design a piston which, while lightly packed, will be steam tight. With first-class workmanship and clean, dry steam, no packing rings will perhaps be required. The piston may be made of considerable length circumferentially and grooved. The loss by leakage will be very small. The disk will have to be made tight in the circumferential slot, and yet the friction must be very little. Here again invention and good workmanship are needed. We see no reason to think the difficulty insurmountable. The abutment can readily be made tight, save where it rests against the edge of the disk. As the disk would be very thin—say ½-inch thick steel plate—the area for leakage would be very small. It is almost impossible to see how it could be made tight by any packing.

If we compare this engine with any of the ordinary types of rotary engine, it will be seen that it has few or none of these disadvantages. Take, for example, an engine with pistons sliding in and out, as shown in Fig. 4. Here A shows one piston—this has to slide in and out of the central drum B a great many times in a minute while under the full pressure of the steam, and the wear and tear at D and C must be very great, with the result that in a very little time the pistons become so loose that they will rattle in the drums; lubrication cannot be maintained, centrifugal force driving away the oil. Again, if we take the type shown in Fig. 5, it will be seen that the abutment has a long stroke, and consequently cannot be quite closed until the piston has gone some distance, so that all the steam in the space A may be regarded as wasted. Furthermore, the end of the abutment can by no possible means be kept from hammering against the central drum. If it does not come in contact with it the leakage is enormous, because the joint is as long as the piston; if it does, then, as the speed with which it moves inward must be considerable, it must strike a severe blow, and accordingly all engines made on this system which we have seen are noisy to a degree. But, besides all this, the wear and tear is much greater near the outer circumference than they are nearer the center, and so leakage soon takes place next the piston-end. The objections to "line" contracts have been so fully set forth that we need not dwell on them.

That there are objections to this type of engine sketched in Fig. 1 is indisputable, but it must be remembered that no engineer has ever yet attempted to overcome the mechanical difficulties, the existence of which is sufficiently apparent. If such an engine can be made successfully, the reward of the maker will be very large. It is not too much to say, for example, that the modern marine engine would be supplanted in a very short time. A considerable expenditure of time and money and skill and patience will be needed, but no great success has ever been achieved in mechanics without the expenditure of both.

Square Pan, Box and Pipe Former.

The annexed cut represents a square pan and box former recently introduced by the Niagara Stamping and Tool Co., of Buffalo, N. Y. It consists of a table having extension arms provided with four adjustable guages. In the guides operates a clamping-bar which is actuated by the treadle and spring shown. In front of the clamping-bar is a hinged folder-bar provided with a handle. The clamping-bar has separable pieces which are screwed against its face. These pieces vary in length, being 2, 3, 4, 6 and 8 inches long respectively. By a combination of these pieces shallow pans 1 inch deep may be formed any length and width from 2 inches upward, varying by single inches; for instance, a 4 and 3 inch piece will fold a 7-inch pan, box, &c. For forming furnace-pipe and similar work having no folded edges a clamping-piece as long as the machine is used. In operation the body or blank is first brought against the guage nearest to the operator and one corner formed. Then the sheet is moved against the second guage and the operations repeated until all four sides are completed.

Square Pan, Box and Pipe Former, Made by the Niagara Stamping and Tool Co., Buffalo, N. Y.

Suckow's Extension Jack.

Messrs. Pedrick & Ayer, of the L. B. Flanders Machine Works, of Philadelphia, Pa., are now turning out a new form of jack shown in the accompanying cut. This jack differs from other makes of screw-jacks in that it has a ball-and-socket joint at the base and at the top of the screw. The ball bearing at the base allows the body of the jack to gyrate in any direction to an angle of about 30°. The ball at the bottom is held by two screws, one fitting in a groove in the ball, the other clamping the body of the ball, making the jack stiff and solid in any desired position, and, at the will of the operator, can be loosened and made a complete carrying jack. Another advantage of the ball bearings is that the jack, bearing and load, can be in almost any position, allowing the screw to work free, without packing strips or wedges to give equal bearings. It is made with or without the projecting foot at bottom of screw. The screw is of cast steel, with threads cut in the lathe; the shape of the thread is a half V. This thread works in a bronze nut. The base of the jack is strong and heavily ribbed—size, 15 x 8½ inches. For wrecking purposes this jack is eminently serviceable, and will be found valuable for any other purpose for which a jack is required. It is made of the best material and in the best manner, and will stand rough usage. Hight of jack when down, 27½ inches; rise of screw, 9½ inches; diameter of screw, 3 inches; weight of jack, 80 pounds; capacity, 50 tons; raise of foot, 9½ inches.

Extension Jack Made by the L. B. Flanders Machine Works, Philadelphia, Pa.

From Buenos Ayres the most important news received by the last mail is the success of the Argentine loan in London, amounting to £4,000,000, the proceeds of which will be employed in discharging obligations incurred in extending railway enterprises, building ports and in making various city improvements. The money for these purposes was advanced by the National and Provincial banks of Buenos Ayres.

WHITE MOUNTAIN FREEZER COMPANY,

Nashua, N. H., U. S. A.

WE LEAD. ❁ COMPETITION FOLLOWS.

HAND OR POWER FREEZER.

Sizes, 25 and 50 Quarts.

Just the machine for confectioners requiring a first-class Freezer, and, if desired, a fly-wheel can be substituted in place of Pulley, and the Freezer operated by Hand.

NEW PLATFORM FREEZER.

Sizes, 15, 20 and 25 Quarts.

Especially adapted to use of Hotels, Restaurants and Ice Cream Parlors.

By substituting pulley in place of fly-wheel it can be operated by power.

Sands' Patent Freezer Clamp or Holder.

A device for holding the tub firmly while freezing.

SANDS' PATENT TRIPLE MOTION

"WHITE MOUNTAIN"

ICE CREAM FREEZER

STANDS AT THE HEAD

IN POINT OF

Mechanical Construction, Simplicity of Operation, Durability, and, above all, Excellence of Production.

The only Freezer ever made having three distinct motions, thereby producing FINER, SMOOTHER CREAM THAN ANY OTHER FREEZER ON THE MARKET.

Acknowledged by every one to be the best in the world. Over 300,000 in use to-day.

The Tubs are chemically filled, and water proof.

Outside Irons Galvanized, but all inside the can COATED WITH PURE BLOCK TIN.

"Never put anything into the human stomach prepared in vessels coated with zinc."—*The Metal Worker.*

Packing Tubs and Packing Cans, all sizes, Wholesale and Retail.

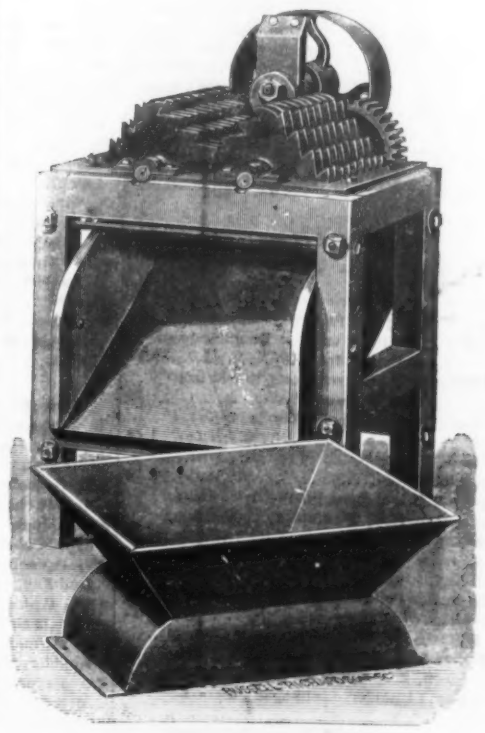
For Illustrated Catalogue, Price List and Trade Discounts, address the

MANUFACTURERS,

WHITE MOUNTAIN FREEZER CO.

NASHUA, N. H., U. S. A.

☞ *Special Attention Given Export Orders.*

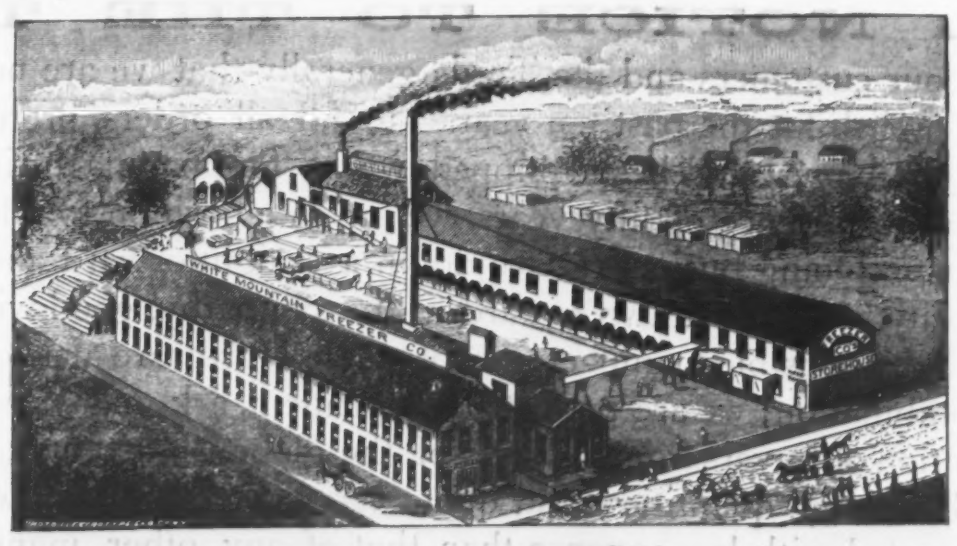


Sands' Large Hand or Power Ice Crusher.

Capable of crushing tons of ice daily.
Can be adjusted to break fine or coarse.

SANDS' FAMILY ICE CRUSHER.

We have introduced a larger size Crusher, operated upon same principle as above, for use of Hotels, Ice Cream Saloons, &c.



HOME OF THE "WHITE MOUNTAIN."

The Largest Freezer Works in the World.

"White Mountain" Hand Freezer.

Ready to Operate.

Sizes, 2, 3, 4, 6, 8, 10, 15, 20, 25 and 60 Quarts.

OFFICE OF

MANHATTAN BUILDERS' AND READING, STANDARD HARDWARE GOODS

Change to net bottom prices of all goods manufactured by us. Prices good until April 1st. *Terms, cash in 15 days.* No discount for spot cash. No deviation from these prices for quantities less than $1000. None but dealers in Hardware and kindred goods can buy from us. We sell no others. Prices as given here are the same to domestic and foreign purchasers. All goods warranted first-class in every respect, and as good at least as those made by the oldest and best makers in the universe. Orders can be sent with perfect confidence that our goods are *standard*, finely finished, and made to suit the best trade. All goods delivered F. O. B. here. No charge for cesing or cartage. Freight, same rates as from Philadelphia:

LOCKS.

Upright Rim Knob Locks.

No.	Per doz.
300, 4-inch, 2 Copper Bronze Iron Bolts, 1 tumbler, 12 changes, without Knobs, complete, Copper Bronze Iron Key	$0.77
308, 4-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes	.85
309, 4-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes	1.19
310, 4-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes	1.44
310½, 4¼-inch, 2 Copper Bronze Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop	.85
311, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop	.92
312, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with stop	1.24
313, 4¼ inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with stop	1.49
314, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch	.97
315, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Bolt, with stop	1.02
316, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 12 changes, 1 tumbler, with Patent Reversible Bolt and stop	1.39
317, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with Patent Reversible Bolt and Stop	1.54
318, 4¼-inch, 3 Polished Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, with stop and Patent Reversible Latch	1.27
319, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with stop, Reversible Latch	1.49
320, 4¼-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, with stop and Patent Reversible Latch	1.94
321, 4¼-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, with Patent Reversible Latch	1.44
322, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, with Patent Reversible Latch	1.69
323, 4¼-inch, 3 Polished Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	2.21
324, 4¼-inch, 2 Iron Bolts, tinned Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch	.97
417, 4¼-inch, 2 Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop	1.37
418, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop	1.64
419, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch, with stop	2.16
420, 5-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, with Patent Reversible Latch and stop	1.87
421, 5-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	2.37
422, 5-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	2.62
423, 5-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	2.47
424, 5-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	2.97
425, 5-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	3.82
414, 6-inch, 2 Iron Bolts, Tinned Iron Key, 1 Tumbler, 12 changes, Patent Reversible Latch	2.92
415, 6-inch, 2 Polished Iron Bolts, Brass Key, 1 Tumbler, 12 changes, Patent Reversible Latch	3.42
416, 6-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	4.19
400, 6-inch, 3 Polished Iron Bolts, tinned flat Iron Key, 1 tumbler, 12 changes, Patent Reversible Latch	3.49
401, 6-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	3.99
403, 6-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	4.87

Horizontal Rim Knob Locks.

25, 4¼-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 1 tumbler, 12 changes, with stop	$1.02
326, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 12 changes, 1 tumbler, with stop	1.34
327, 4¼-inch, 2 Polished Brass Bolts, Brass Key, 12 changes, 1 tumbler, with stop	1.69
328, 4¼-inch, 2 Polished Iron Bolts, tinned Iron Key, 12 changes, 1 tumbler	97
328½, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 12 changes, 1 tumbler	1.22
329, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes	1.62
330, 4¼-inch, 2 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, with Patent Reversible Latch and stop	1.11
331, 4¼-inch, 2 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	1.42
332, 4¼-inch, 2 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch and stop	1.72
340, 4¼-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent	1.47
341, 4¼-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	1.87
342, 4¼-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	2.62
343, 5-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch	2.41
344, 5-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	2.91
345, 5-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	3.62
346, 6-inch, 3 Polished Iron Bolts, tinned Malleable Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch	3.18
347, 6-inch, 3 Polished Iron Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	3.72
348, 6-inch, 3 Brass Bolts, Brass Key, 1 tumbler, 12 changes, Patent Reversible Latch	4.61

Mortise Knob Locks.

450, 3½-inch, 2 Polished Iron Bolts, tinned flat Malleable Iron Key, polished and lacquered Iron front and strike, Japanned Cases and Escutcheons, 1 tumbler, 12 changes, Patent Reversible Latch	$1.32
451, 3½-inch, Iron front and strike, tinned Malleable Iron Key, 2 Brass Bolts, Brass Key; same finish as No. 450	1.97
452, 3½-inch, 2 Polished Iron Bolts, Brass Key; same finish as No. 450	1.57
453, 3½-inch, 2 Brass Bolts, Brass Key, Brass front and strike; same finish as No. 450	2.82
454, 4-inch, 2 Polished Iron Bolts, polished and lacquered front and strike, tinned flat small Iron Key, Japanned Case and Escutcheons, 1 tumbler, 12 changes, Patent Reversible Latch	1.82
455, 4-inch, do., do., do., Brass Key	2.07
456, 4-inch, do., do., do., Brass Bolts and Key	2.92
457, 4-inch, Brass front and strike, Brass Key; same finish as No. 454	3.21
460, 3⅛-inch, Olympian Bronzed Ornamental Iron front and strike, tinned flat small Iron Key, 12 changes, 1 tumbler, Patent Reversible Latch	1.92
465, 3⅛-inch, do., do., do., Brass Key	2.07
470, 3⅛-inch, do., do., Brass Bolts and Key	3.06
475, 4⅛ x 3⅛, Brass front and strike, nickel-plated Key, 2 Brass Bolts, 2 tumblers, 24 changes	4.82
476, do., do., Brass Key; nickel-plated	5.12
480, 5 x 4, Brass front and strike, Ornamental, nickel-plated flat Brass Key, 24 changes, 2 Brass Bolts	6.19

Knob Latches, &c.

216, 2½ x 3¾, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, Iron Hub	$0.50
217, 2½ x 3¾, Horizontal Rim Knob Latch, 2 Brass Bolts, Iron Hub	.92
218, 2½ x 3¾, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, Iron Hub, Iron Slide Bolt	.71
219, 2½ x 3¾, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, Brass Thumb-piece	.89
225, 2 x 3½, Horizontal Rim Knob Latch, 2 Polished Iron Bolts, flush Thumb-piece, Patent Reversible Bolt	.68
227, 2 x 3½, Horizontal Rim Knob Latch, 2 Brass Bolts, Patent Reversible Latch	1.15
67, Thumb Latch, Wrought Iron Latch, Japanned, weight 6 pounds per doz	.21

We are now making as fine Locks as any manufacturer in the United States. With our new and extensive works in full operation we will be able to turn out nearly 1000 doz. per day, and selling as we do from 25 to 50 per cent. less than others, and by our present improved method of doing business making a fair, living profit, which is satisfactory to us. The trade throughout the country appreciates our method by extending to us a very large trade, which we will do our best to hold, and by fair, legitimate means increase. We warrant our Locks to be equal to those of any manufacturer, inside or outside the combination, and, although we sell them lower, we do not, on that account, make them anything but *first class*, finely finished and well japanned. We are adding new patterns continually, and in a short time the trade can depend on a full line of goods that are saleable and *first class* in every respect.

Broughton's Patent Burglar-Proof Sash Locks.

Patented Oct. 8th, 1879.

The Broughton Burglar-Proof Sash Locks are perhaps the best known article to-day in America. The patent was granted to John Broughton, who died in 1879, and who during his lifetime had created more articles of great merit than any man in America. The Broughton Oiler invented by him is known the world over, and when the patent, which we own, on his *Burglar Proof Sash Locks* expires we are satisfied that they will take the place of all others, for the reason that they are the simplest, cheapest and best article of the kind ever made in any country, and until we had erected our new works could not supply the demand. It has now been on the market for over six years, and the demand is more than doubling every year. While we control these goods by patent, we sell them as low as if everybody had the right to make them. Our principle of business is: No matter how meritorious an article may be, no matter how much better it may be than those made by others, to sell at a fair margin of profit, sell largely, and give the public as much benefit as we expect ourselves. We could fill the columns of *The Iron Age* with testimonials from this and other countries as proof of the intrinsic merits of the "Broughton Burglar Proof Sash Locks." We could refer to some of the leading trade in this country who would admit that at first they only bought a few dozen, but to-day are ordering in 1000-dozen lots and even more; but a good article of Real Merit like this always takes care of itself, as it were, and we would simply state to the trade that the standard will be kept up by us, and improved if possible. These Sash Locks can be had at most all leading Hardware stores in the United States and Canada.

No.	Per doz.
1, Iron, Etruscan Bronze, Plain Lever, fine finish and extra heavy	$0.24
2, Iron, Etruscan Bronze, Porcelain Knob, fine finish	.28
6, Ornamental Iron, Etruscan Bronze, Plain Lever, fine finish	.30
7, Ornamental Iron, Etruscan Bronze, Porcelain Knob, fine finish	.36
10, Iron, Etruscan Bronze, Plain Lever, fine finish	.24
15, Iron, Etruscan Bronze, Porcelain Knob, fine finish	.30
20, Ornamental Iron, Etruscan Bronze, Plain Lever, fine finish	.32
25, Ornamental Iron, Etruscan Bronze, Porcelain Knob, fine finish	.36
30, Ornamental Iron, Olympian Bronze, Plain Lever, fine finish	.44
35, Ornamental Iron, Olympian Bronze, Porcelain Knob, fine finish	.50
40, Ornamental Iron, Olympian Bronze, Real Bronze Knob, fine finish	.82
41, Ornamental Iron, Olympian Bronze, Plain Lever, Extra Heavy, fine finish	.52
42, Ornamental Iron, Olympian Bronze, Porcelain Knob, Extra Heavy, fine finish	.58
43, Ornamental Iron, Olympian Bronze, Real Bronze Knob, Extra Heavy, fine finish	.81
45, Ornamental Iron, Nickel-Plated, Plain Lever, fine finish	1.24
50, Ornamental Iron, Nickel-Plated, Porcelain Knob, fine finish	1.36
51, Ornamental Iron, Nickel-Plated, Brass Knob, fine finish	1.72
52, Ornamental Iron, Nickel-Plated, Porcelain Knob, old gold inlaid	2.08
53, Ornamental Iron, Nickel Plated, Real Bronze Knob, old Gold inlaid	2.27
54, Ornamental Iron, Nickel Plated, 2 Real Bronze Knobs, old Gold inlaid	2.72
73, Ornamental Iron, Bronze Metal Knob, very heavy, old Gold inlaid	1.62
80, Ornamental Iron, Olympian Bronze, Real Bronze Knobs, very heavy	1.71
85, Ornamental Iron, Olympian Bronze, Real Bronze Knobs, very heavy	1.92
90, Ornamental Iron, Olympian Bronze, Porcelain Knob, very heavy	1.28
95, Ornamental Iron, Olympian Bronze, Bronze Metal Knob, very heavy	1.73
100, Ornamental Iron, Olympian Bronze, 2 Bronze Metal Knobs, very heavy	2.36
53, Ornamental Iron, Olympian, Nickel Plated, Porcelain Knob, very heavy	2.18
72, Ornamental Iron, Olympian, Nickel Plated, Brass Knob, very heavy	2.71
73, Ornamental Iron, Olympian, Nickel Plated, 2 Brass Knobs, very heavy	3.18
210, Ornamental Iron, Etruscan Bronze, Iron Knob, very heavy	.60
211, Ornamental Iron, Olympian Bronze, Iron Knob, very heavy	.75
212, Ornamental Iron, Pompeii Bronze, Iron Knob, very heavy	.85
213, Ornamental Iron, Nickel Plated, Nickel Plated Knob, very heavy	1.25
214, Ornamental Iron, Nickel Plated, Rich old Gold inlaid, very heavy	1.50
215, Ornamental Iron, Nickel Plated, Pale old Gold inlaid	1.60
216, Ornamental Iron, Nickel Plated, Fire old Gold inlaid, very heavy	1.75
217, Ornamental Iron, Nickel Plated, Crimson old Gold inlaid, very heavy	1.85
218, Ornamental Iron, Nickel Plated, Blue old Gold inlaid, very heavy	1.90
219, Ornamental Iron, Green old Gold inlaid, very heavy	1.95
220, Ornamental Iron, Nickel Plated, Copper Color old Gold inlaid, very heavy	2.00
221, Ornamental Iron, Nickel Plated, Lemon old Gold inlaid, very heavy	2.05
300, Ornamental Iron, Etruscan Bronze, very heavy, plain Knob and Lever	.72
305, Ornamental Iron, Olympian Bronze, very heavy, plain Knob and Lever	.85
310, Ornamental Iron, Pompeii Bronze, very heavy, plain Knob and Lever	.96
325, Ornamental Iron, Nickel Plated, very heavy, plain Knob and Lever	2.12
330, Ornamental Iron, Nickel Plated, Electro Bronze, plain Knob and Lever	1.16
350, Ornamontal Iron, Nickel Plated, Electro Bronze	.93
355, Ornamental Iron, Nickel Plated, Electro Bronze	1.08
360, Ornamental Iron, Nickel Plated, Electro Bronze	1.24
365, Ornamental Iron, Nickel Plated, Electro Bronze	2.18
370, Ornamental Iron, Nickel Plated, Electro Bronze	2.62
375, Ornamental Iron, Nickel Plated, Electro Bronze	2.48
380, Ornamental Iron, Nickel Plated, old Gold inlaid	2.97

Real Bronze and Brass.

Broughton Burglar-Proof Sash Locks.

No.	Per doz.
55, Plain Finish, Cast Brass, Fine Polish, Plain Lever	$1.37
65, Plain Finish, Cast Brass, Fine Polish, Porcelain Knob	1.48
67, Plain Finish, Cast Brass, Fine Polish, Real Bronze Knob	1.72
70, Plain Finish, Cast Brass, Fine Polish, Brass Knob	1.63
155, Ornamental Real Bronze, Plain Flat Lever, extra Polish and Lacquered, with Real Bronze Screws	1.47
165, Ornamental Real Bronze Metal, Bronze Metal Knob, extra heavy, Fine Polish and Finish, with Real Bronze Screws	1.62
175, Ornamental Real Bronze, two Real Bronze Metal Knobs, with Real Bronze Screws, fine finish	1.87
185, Ornamental Real Bronze, two Bronze Metal Knobs, Bronze Metal Screws, very heavy	2.10
190, Ornamental Real Bronze Metal, two Real Bronze Metal Knobs, very heavy, Real Bronze Screws	2.24
222, Ornamental Cast Brass, Brass Knob, very fine finish, with Brass Screws, very heavy	2.18
223, Ornamental Cast Brass, Brass Knob, Nickel-Plated, with Nickel-Plated Screws	2.62
224, Ornam'ntl Cast Brass, two Brass Knobs, Nickel-Plated, with Nickel-Plated Screws	2.84
225, Ornamental Real Bronze and Silver-Plated, elegant finish—fit for the gods—each	3.00
226, Ornamental Real Bronze, two Bronze Metal Knobs, Gold-Plated, with Gold-Plated Screws—fit for a palace—each	5.00
315, Ornamental Polished Wrought Brass, hand made, two Brass Knobs, with Brass Screws, each	1.00
330, Ornamental Real Bronze, hammered by hand, two Real Bronze Knobs, very elegant, each	1.50
385, Ornamental Real Bronze, Japanese finish, splendid and unique shade, polished and lacquered in a new style of art, known only to us, with Real Bronze Knobs and screws, each	1.75
390, Ornamental Real Bronze, after the style of the old Chinese pattern as found in the ruins of Pompeii, made only by us, who own the original pattern, with the finest art finish, embossed, each	3.50

All Sash Locks from No. 20 to No. 390 packed with Screws, according to style of finish.

Brackets.

No.	Per doz. pairs.
34, 4 x 5, Ornamental Store Shelf, Japanned	$0.40
35, 5 x 6, Ornamental Store Shelf, Japanned	.61
37, 6 x 8, Ornamental Store Shelf, Japanned	.84
38, 7 x 9, Ornamental Store Shelf, Japanned	.96
39, 8 x 10, Ornamental Store Shelf, Japanned	1.12

SPECIAL NOTICE TO THE TRADE:

We are pleased to announce to our customers and the Trade generally that we are now prepared to do what we have not been able to accomplish for the past ten years—to fill all orders promptly, and in large or small quantities. Having erected here the largest and best-equipped works for manufacturing our line of goods in the country, and bringing to our aid an experience of fifty years, we are in a position to offer special inducements to the Trade everywhere to buy from us. Doing business as we do, in a straightforward and manly way, and treating all customers alike for the same quantity, we have drawn toward us the sympathy, good-will and assistance of the best trade in America. We are the only responsible manufacturers of staple Hardware articles in this "Free Country" who *dare* do this. We belong to no combination; we are perfectly independent, ask no favors, but grant many, and our net rock prices have attracted the attention of buyers from all parts of the globe, so that we can give our hands steady work all the year round, turn out goods in large quantities, and quote *net rock bottom prices* that none can compete with. We claim that our business is operated with less expense than that of any other manufacturer in any line in this country; and owning, as we do, the best patents on staple Builders' Hardware articles, that enable us to cheapen the cost of production, we take front rank as the *Standard Hardware Manufacturing Company* of the United States.

HARDWARE CO., MANUFACTURERS OF

GENERAL HARDWARE.

PA., U. S. A.

AT NET BOTTOM PRICES.

March 4, 1886.

40, 8 x 12, Ornamental Store Shelf, Japanned..... 1.32
45, 4 x 5, Ornamental Store Shelf, Etruscan Bron ze, with Screws..... .60
50, 5 x 6, Ornamental Store Shelf, Etruscan Bronze, with Screws..... .93
55, 6 x 8, Ornamental Store Shelf, Etruscan Bronze, with Screws..... 1.12
57, 7 x 9, Ornamental Store Shelf, Etruscan Bronze, with Screws..... 1.21
60, 8 x 10, Ornamental Store Shelf, Etruscan Bronze, with Screws..... 1.62
65, 8 x 12, Ornamental Store Shelf, Etruscan Bronze, with Screws..... 1.98

Ornamental Library Brackets.

No.	Price.
70, 4 x 5, Etruscan Bronze, with Screws.....	$0.84
75, 5 x 6, Etruscan Bronze, with Screws.....	1.05
77, 5 x 7, Etruscan Bronze, with Screws.....	1.21
80, 6 x 8, Etruscan Bronze, with Screws.....	1.32
82, 7 x 9, Etruscan Bronze, with Screws.....	1.64
85, 8 x 10, Etruscan Bronze, with Screws.....	2.08
90, 8 x 12, Etruscan Bronze, with Screws...	2.62
95, 10 x 12, Etruscan Bronze, with Screws....	2.92

Ornamental Cabinet Brackets.

No.	Price.
100, 4 x 5, Pompeii Bronze, with Screws.....	$0.96
105, 5 x 6, Pompeii Bronze, with Screws.....	1.24
107, 5 x 7, Pompeii Bronze, with Screws.....	1.48
110, 6 x 8, Pompeii Bronze, with Screws.....	1.64
112, 7 x 9, Pompeii Bronze, with Screws.....	1.96
115, 8 x 10, Pompeii Bronze, with Screws.....	2.47
120, 8 x 12, Pompeii Bronze, with Screws.....	2.96
125, 10 x 12, Pompeii Bronze, with Screws....	3.24

Fancy Ornamental Drawer Pulls.

No.	Per gross.
20, 3⅛-inch Copper Bronzed, with Screws...	$0.84
22, 3⅛-inch Etruscan Bronze, with Screws...	1.21
24, 3⅛-inch Olympian Bronze, with Screws..	1.42
25, 3⅛-inch Pompeii Bronze, with Screws....	1.56
35, 4-inch Copper Bronze, with Screws.....	.96
37, 4-inch Etruscan Bronze, with Screws.....	1.48
39, 4 inch Olympian Bronze, with Screws.....	1.62
40, 4-inch Pompeii Bronze, with Screws... ..	1 72
50, 4½-inch Copper Bronze, with Screws.....	1.28
52, 4½-inch Etruscan Bronze, with Screws...	1.62
54, 4½-inch Olympian Bronze, with Screws..	1.84
55, 4½-inch Pompeii Bronze, with Screws....	2.16
27, 3⅛-inch Etruscan Bronze, with Screws...	1.24
29, 3⅛-inch Olympian Bronze, with Screws..	1.36
30, 3⅛-inch Pompeii Bronze, with Screws....	1.48
42, 4-inch Etruscan Bronze, with Screws ...	1.48
44, 4-inch Olympian Bronze, with Screws....	1.62
45, 4-inch Pompeii Bronze, with Screws	1.72
57, 4½-inch Etruscan Bronze, with Screws...	1.62
59, 4½-inch Olympian Bronze, with Screws..	1.84
60, 4½-inch Pompeii Bronze, with Screws. ..	2.16
32, 3⅛-inch Etruscan Bronze, with Screws...	1.24
34, 3⅛-inch Olympian Bronze, with Screws..	1.36
35, 3⅛-inch Pompeii Bronze, with Screws....	1.48
47, 4-inch Etruscan Bronze, with Screws.....	1.48
49, 4-inch Olympian Bronze, with Screws....	1.62
50, 4-inch Pompeii Bronze, with Screws.....	1.72
62, 4½-inch Etruscan Bronze, with Screws...	1.62
64, 4½-inch Olympian Bronze, with Screws..	1.84
65, 4½-inch Pompeii Bronze, with Screws....	2.16

Real Bronze Ornamental Drawer Pulls.

No.	Per doz.
224, 3⅛-inch Genuine Bronze Metal, with Real Bronze Screws.....	$1.08
239, 4-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.36
254, 4½-inch Genuine Bronze Metal, with Real Bronze Screws	1.72
229, 3⅛-inch Genuine Bronze Metal, with Real Bronze Screws..	1.08
244, 4-inch Genuine Bronze Metal, with Real Bronze Screws.	1.36
259, 4½-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.72
234, 3⅛-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.08
249, 4-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.36
264, 4½-inch Genuine Bronze Metal, with Real Bronze Screws.....	1.72

Window Pulleys.

No.	Per doz.
1, 1¾-inch, in Bulk, Plain Front and Wheel..	$0.12
2, 2-inch, in Bulk, Plain Front and Wheel....	.15
3, 2¼-inch, in Bulk, Plain Front and Wheel..	.19
4, 2½-inch, in Bulk, Plain Front and Wheel..	.23

Window Pulleys.

Extra heavy, best quality.

No.	Price, per doz.
1¾-inch, in Bulk, polished wheel, plain front.	$0.14
2-inch, in Bulk, polished wheel, plain front..	.18
2¼-inch, in Bulk, polished wheel, plain front.	.21
2½-inch, in Bulk, polished wheel, plain front.	.25
1¾-inch, in paper, polished wheel, plain front	.15
2-inch, in paper, polished wheel, plain front.	.19
2¼-inch, in paper, polished wheel, plain front	.22
2½-inch, in paper, polished wheel, plain front	.26
1¾-inch, in paper, polished wheel, bronzed front and wheel...	.17
2-inch, in paper, polished wheel, bronzed front and wheel.	.21
2¼-inch, in paper, polished wheel, bronzed front and wheel	.24
2½-inch, in paper, polished wheel, bronzed front and wheel.	.28

We warrant our pulleys to be as good as the very best made by any manufacturer in the country, all riveted, with headed wrought iron rivets, wide wheel, wheel polished and wide case.

Hat and Coat, Harness, Fancy and Plain Hooks.

No.	Per gross.
75, Japanned, perfect screw holes, always true. Weight 15 pounds per gross.....	$0.50
210, Japanned Bull frog pattern, standard goods, 20 pounds per gross...	.66
215, Coppered Bull frog Pattern, standard goods, 20 pounds per gross.....	.66
110, Japanned Schoolhouse Hooks, extra Heavy	1.07
260, Ornamental Coat and Hat Hooks, Brzd.. fine pattern.....	1.72
265, Ornamental Coat and Hat Hooks, Olympian Bronze pattern.....	1.96
266, Ornamental Coat and Hat Hooks, Pompeii Bronze pattern.....	2.08
275, Ornamental Coat and Hat Hooks, with wrought Screw, very fine.....	2.08
276, Ornamental Coat and Hat Hooks, with wrought Screw, Etruscan Bronze.	2.16
277, Ornamental Coat and Hat Hooks, with wrought Screw, Olympian Bronze.....	2.40
278, Ornamental Coat and Hat Hooks, with wrought Screw, Pompeii Bronze.....	2.69
279, Ornamental Coat and Hat Hooks, with wrought Screw, Nickel-plated	3.67
280, Ornamental Coat and Hat Hooks, with wrought Screw, Nickel-plated, old Gold inlaid.....	4.12
281, Ornamental Coat and Hat Hooks, with wrought Screw, Real Bronze, per doz.....	2.62
282, Ornamental Coat and Hat Hooks, with wrought Screw, Real Brass, old Gold inlaid, per doz..... ..	2.12
290, Ornamental Coat and Hat Hooks, with wrought Screw, very heavy, Etruscan Bronze, per gross..... .	2.20
295, Ornamental Coat and Hat Hooks, very heavy, Olympian Bronze per gross.....	2.30
296, Ornamental Coat and Hat Hooks, very heavy, Pompeii Bronze, per gross..	2.40
297, Ornamental Coat and Hat Hooks, Real Bronze, with Real Bronze Screws, per doz .	1.62
298, Ornamental Coat and Hat Hooks, Real Brass, with Real Bronze Screws, per doz...	1.42
299, Ornamental Coat and Hat Hooks, Brass, nickel-plated, per doz.....	2.84

Our fancy Coat and Hat Hooks are well and favorably known to the trade, and are recognized as the best value ever offered. While they are extra fine, we sell them, as we do all our goods, at a fair profit, and not at an arbitrary one. We prefer to sell a large quantity of any article at a moderate profit than a few once in a while at a big profit In the end we make more money by doing our business in this way.

Bird-Cage Hooks.

No.	Per doz.
140, Ornamental Iron, 8-inch, with wrought Screw, Etruscan Bronze.....	$0.24
150, Ornamental Iron, 8-inch, with wrought Screw, Olympian Bronze...	.29
145, Ornamental Iron, 10-inch, with wrought Screw, Olympian Bronze..... ..	.30
155, Ornamental Iron, 10-inch, with wrought Screw, Etruscan Bronze.....	.27
160, Ornamental Iron, 8-inch, Swinging, Etruscan Bronze.....	.28
180, Ornamental Iron, 8-inch, Swinging, Olympian Bronze.....	.30
170, Ornamental Iron, 10-inch, Swinging, Etruscan Bronze....	.36
190, Ornamental Iron, 10-inch, Swinging, Olympian Bronze.....	.40
154, Ornamental Iron, 8-inch, with Screw, Pompeii Bronze.....	.32
147, Ornamental Iron, 10-inch, with Screw, Pompeii Bronze.....	.40
162, Ornamental Iron, 8-inch, Swinging, Pompeii Bronze....	.36
182, Ornamental Iron, 10-inch, Swinging, Pompeii Bronze	.45

These Bird-Cage Hooks are of the first quality, fine finish, design tasty, and handsome, and sell largely wherever introduced.

Store-Door Handles, &c.

No.	Per doz.
140, Ornamental Iron, Store-Door Handles, extra heavy, Etruscan Bronze..... ...	$1.84
141, Ornamental Iron, Store-Door Handles, extra heavy, Olympian Bronze.....	1.98
142, Ornamental Iron, Store-Door Handles, extra heavy, Pompeii Bronze	2.11
241, Ornamental Iron, Store-Door Handles, Real Bronze, very heavy.....	8.00
375, Ornamental Parlor Match Safes, Etruscan Bronze.....	1.56
380 Ornamental Parlor Match Safes, Pompeii Bronze.....	1,82
395, Ornamental Paror Match Safes, Etruscan Bronze.	1.86
396, Ornamental Parlor Match Safes, Pompeii Bronze.....	1.92
376, Ornamental Parlor Match Safes, Nickel-Plated, very elegant.....	3.00
397, Ornamental Parlor Match Safes, Nickel-Plated, very elegant....	4.00
398, Ornamental Parlor Match Safes, Nickel-Plated, Old Gold Inlaid.....	5.00
399, Ornamental Parlor Match Safes, Nickel-Plated, Old Gold Inlaid....	4.50

Our Match Safes are well known, the handsomest and cheapest ever made, and a trial will prove it to your satisfaction.

Casters.

	Per set.
1⅝-inch, No. 1, Iron Fork and Wheel, packed 1 set in paper	4 ¢
1⅝-inch, No. 2, Iron Fork and Wheel, packed 1 set in paper	4½¢
1⅝-inch, No. 3, Iron Fork and Wheel, packed 1 set in paper....	4½¢
2-inch, No. 1, Iron Fork and Wheel, packed 1 set in paper..	6 ¢
2 inch, No. 2, Iron Fork and Wheel, packed 1 set in paper.....	6¼¢
2-inch, No. 3, Iron Fork and Wheel, packed 1 set in paper....	6¾¢
2-inch, No. 4, Iron Fork and Wheel, packed 1 set in paper	7 ¢
1⅝-inch, No. 1, Iron Fork and Porcelain Wheel, 1 set in paper.....	5⅝¢
1⅝-inch, No. 2, Iron Fork and Porcelain Wheel, 1 set in paper	6 ¢
1⅝-inch, No. 3, Iron Fork and Porcelain Wheel, 1 set in paper	6¾¢
2-inch, No. 1, Iron Fork and Porcelain Wheel, 1 set in paper	7⅝¢
2-inch, No. 2, Iron Fork and Porcelain Wheel, 1 set in paper.....	8 ¢
2-inch, No. 3, Iron Fork and Porcelain Wheel, 1 set in paper	8¾¢
2-inch, No. 4, Iron Fork and Porcelain Wheel, 1 set in paper.....	10½¢
1⅝-inch, No. 1, Iron Fork and Lignum Vitæ Wheel, 1 set in paper.....	6½¢
1⅝-inch, No. 2, Iron Fork and Lignum Vitæ Wheel, 1 set in paper.....	7 ¢
1⅝-inch, No. 3, Iron Fork and Lignum Vitæ Wheel, 1 set in paper.....	8 ¢
2-inch, No. 1, Iron Fork and Lignum Vitæ Wheel, 1 set in paper.....	8⅝¢
2-inch, No. 2, Iron Fork and Lignum Vitæ Wheel, 1 set in paper.....	9½¢
2-inch, No. 3, Iron Fork and Lignum Vitæ Wheel, 1 set in paper..... ...11	¢
2-inch, No. 4, Iron Fork and Lignum Vitæ Wheel, 1 set in paper..... 13	¢

Globe Wheel Bed Casters.

	Per set
1⅝-inch Globe, Porcelain Wheel, 1 set in paper.....	8⅝¢
1⅝-inch Globe, Lignum Vitæ Wheel, 1 set in paper.....	10 ¢
2-inch Globe, Porcelain Wheel, 1 set in paper	12½¢
2-inch Globe, Lignum Vitæ Wheel, 1 set in paper.....	15 ¢

Philadelphia or French Casters.

No.	Per set.
1, Iron Horn, Iron Wheel, 1 set in paper	4 ¢
2, Iron Horn, Iron Wheel, 1 set in paper.....	4½¢
3, Iron Horn, Iron Wheel, 1 set in paper.....	4⅝¢
4, Iron Horn, Iron Wheel, 1 set in paper.....	5 ¢
5, Iron Horn, Iron Wheel, 1 set in paper.....	5½¢
1, Iron Horn, Lignum Vitæ Wheel, 1 set in paper	5⅝¢
2, Iron Horn, Lignum Vitæ Wheel, 1 set in paper.....	6 ¢
3, Iron Horn, Lignum Vitæ Wheel, 1 set in paper....	6⅜¢
4, Iron Horn, Lignum Vitæ Wheel, 1 set in paper.....	7⅜¢
5, Iron Horn, Lignum Vitæ Wheel, 1 set in paper.....	8 ¢
1, Iron Horn, Porcelain Wheel, 1 set in paper.	5 ¢
2, Iron Horn, Porcelain Wheel, 1 set in paper.	5½¢
3, Iron Horn, Porcelain Wheel, 1 set in paper.	6 ¢
4, Iron Horn, Porcelain Wheel, 1 set in paper.	6⅜¢
5, Iron Horn, Porcelain Wheel, 1 set in paper.	7 ¢
1, Iron Horn, Brass Wheel, 1 set in paper	8 ¢
2, Iron Horn, Brass Wheel, 1 set in paper	9⅜¢
3, Iron Horn, Brass Wheel, 1 set in paper	10 ¢
4, Iron Horn, Brass Wheel, 1 set in paper	14 ¢
5, Iron Horn, Brass Wheel, 1 set in paper	15 ¢

Philadelphia or French Casters.

No.	Per set.
1, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.	13 ¢
2, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	15 ¢
3, brass Horn, Brass Wheel, headed rivet, 1 set in paper	18 ¢
4, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	23 ¢
5, Brass Horn, Brass Wheel, headed rivet, 1 set in paper.....	24 ¢
1, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	9⅜¢
2, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	10 ¢
3, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	11¾¢
4, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper....	14⅜¢
5, Brass Horn, Porcelain Wheel, headed rivet, 1 set in paper.....	15⅜¢
1, Brass Horn, Lignum Vitæ Wheel, headed rivet, 1 set in paper.....	10⅛¢
2, Brass Horn, Lignum Vitæ Wheel, headed rivet, 1 set in paper.....	10⅝¢
3, Brass Horn, Lignum Vitæ Wheel, headed rivet, 1 set in paper....	12 ¢
4, Brass Horn, Lignum Vitæ Wheel, headed rivet, 1 set in paper.....	15⅜¢
5, Brass Horn, Lignum Vitæ Wheel, headed rivet, 1 set in paper.....	16⅛¢

We manufacture more bed and French Casters than any other maker in this country, and can therefore sell cheaper. We are prepared to take orders for any quantity, and can guarantee prompt delivery. Our goods are known every place and sold in endless quantities.

Miscellaneous Goods.

No.	Per gross.
155, Sash Lifts, Ornamental Iron, Etruscan Bronze, packed with Screws.....	$0.89
160, Sash Lifts, Ornamental Iron, Olympian Bronze, packed with Screws.....	1.02
162, Sash Lifts, Ornamental Iron, Pompeii Bronze, packed with Screws..	1.12
260, Sash Lifts, Ornamental Real Bronze, with Real Bronze Screws, per doz.....	.78
300, Sash Lifts, Ornamental Iron, Etruscan Bronze, with Screws, per gross....	.98
305, Sash Lifts, Ornamental Iron, Olympian Bronze, with Screws, per gross.....	1.12
310, Sash Lifts, Ornamental Iron, Pompeii Bronze, with Screws, per gross.....	1.24
315, Sash Lifts, Ornamental Iron, Nickel Plated, with Nickel-Plated Screws, per gross	3.84
320, Sash Lifts, Ornamental Iron, Nickel Plated, Old Gold Inlaid Plated Screws, per gross.....	4.12
325, Sash Lifts, Ornamental Real Bronze, with Real Bronze Screws, per doz	.84
600, Shutter Bars, Ornamental Iron, Etruscan Bronze, with Screws, per doz.....	.36
605, Shutter Bars, Ornamental Iron, Olympian Bronze, with Screws, per doz.....	.42
610, Shutter Bars, Ornamental Iron, Pompeii Bronze, with Screws, per doz.....	.48
615, Shutter Bars, Ornamental Iron, Nickel Plated, with Nickel-Plated Screws, per doz.	1.28
620, Shutter Bars, Ornamental Iron, Nickel Plated, with Old Gold Inlaid. per doz... ..	1.78
625, Shutter Bars, Ornamental Iron, Nickel Plated, Brass, with Screws, per doz.....	3.00
630, Shutter Bars, Ornamental Iron, Real Bronze, with Screws, per doz.....	3.60
1, Newspaper Holder, for Outside Doors, to hold Papers, Iron, Ornamental, per doz....	6.00
Burglar Alarm Lock, for travelers, a splendid article, price each, net.....	1.00

Tower Bolts.

	Per doz.
3-inch, Extra Tower Bolts.....	$0.20
4-inch, Extra Tower Bolts	.22
5-inch, Extra Tower Bolts.....	.33
6-inch, Extra Tower Bolts.....	.42
7-inch, Extra Tower Bolts.....	.53
3-inch, Extra Barrel Bolts...	.21
4-inch, Extra Barrel Bolts.....	.23
5-inch, Extra Barrel Bolts.....	.34
6-inch, Extra Barrel Bolts.....	.42
7-inch, Extra Barrel Bolts	.53

Chest Handles.

No.	Per doz. pairs.
51, Surface Chest Handles	$0.30
53, Surface Chest Handles	.40
55, Surface Chest Handles...	.60

	Per doz.
20, Ornamental Chain Door Fasteners, 6-in., Japanned.....	$0.80
326, Ornamental Chain Door Fasteners, 6-in., Bronzed	.96
425, 6 in. Real Bronze Chain Door Fasteners, complete, with Real Bronze Chain.....	6.25

Blind Hinges, &c.

No.	
1, For wood, adapted to Southern trade, per case of 6 doz. sets	$3.50
1½, Do. do., very heavy.....	4.00
1, Blind and Shutter Bower, for bowing Blinds or Shutters at the regulation angles, per doz., complete.....	.56
100, Do. do., Ornamental, per doz....	.75
200, Ornamental Shutter Knobs, per gross...	2 62
295, Ornamental Shutter Knobs, Pompeii, per gross	2.84
305, Ornamental Shutter Knobs, Real Bronze, per doz....	1.35
130, Harness Hooks, 4½-inch, Japanned, per doz	.24
132, Harness Hooks, 5¼-inch, Japanned, per doz	.30
134, Harness Hooks, 5½-inch, Japanned, per doz.....	36
136, Harness Hooks, 6-inch, Japanned, per doz	.40

SPECIAL NOTICE TO THE TRADE:

We warrant our goods to be first-class in every respect, finished in the best and latest styles, with new and artistic designs that are original with us. Employing the best skilled designers and engravers that can be found, we spare no means to give to our Trade a fair and honest return for their money. Selling goods as we do on close time, and to none but responsible dealers, our losses for the past three years have been only $25.11, which is a record that no bank even can show—who are supposed to do the safest business. With this method of doing business we have been successful, and are enabled to double our trade every year, and give the Hardware Trade the benefit of prices that enables them to buy at a standard. We return our sincere thanks to our many customers throughout the country who have treated us so kindly, and have continued to send us orders, knowing, as they did, that they often would have to wait for months before getting their orders filled. *THAT*, we can safely state, is now past, as our facilities for turning out goods now are very large, and, while it would not surprise us to be overrun with more orders again than we can fill at sight, still the delay would only be nominal. Send in the orders, we are now ready!

Respectfully,

MANHATTAN HARDWARE CO.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, March 4, 1886.

DAVID WILLIAMS. *Publisher and Proprietor.*
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The office of this journal is removed to 66 and 68 Duane Street.

Centralization in the Nail Trade.

The prospect of the early starting of the nail mills of the West brings the trade face to face once more with the fact that the nail-cutting capacity is far in excess of the present requirements of the country. We do not wish to convey the impression that their return to activity is going to produce an early glut in the market, and that there is a prospect of a prompt decline in the East. The enforced restriction of output during the last nine months has left the country bare of nails, and it will take some time, especially with the spring demand close at hand, before the supply will become unmanageable. Our present purpose is to look beyond the immediate future, and to point out to the trade some of the causes which are likely to influence the business deeply for a long period to come. The strike in the Western mills has to some extent arrested the progress of the substitution of steel for iron as the raw material for nails, and has diverted attention from that contest. Meanwhile a good deal of progress has been quietly made in providing facilities. This has been done in two ways—by the erection of Bessemer plants of the ordinary type, and by the building of Clapp-Griffiths plants. Wheeling now has three steel works—the Bellaire, with two 4-ton converters; the Riverside, with two 5-ton vessels, both running since 1884, and the Wheeling, with two 5-ton converters approaching completion. In addition to these the Laughlin and Junction Steel Co., at Mingo, Ohio, have just started a two 5-ton plant. All of these were built exclusively to make steel for nails, though some of the product has been marketed as merchant steel. The Western Steel Co., lessees of the old Vulcan plant, at St. Louis, are composed largely of parties interested in the nail trade, and a large part of the product will seek an outlet in that form. In Pittsburgh Shoenberger & Co. are putting up a 7-ton converter which will turn out some steel for nail plate. In addition to this a number of the older Bessemer works have given attention to making mild steel for the same purposes.

Among the Clapp-Griffiths plants that of the Western Nail Co., at Belleville, has already started; the E. & G. Brooke Iron Co. will have a single converter combining the features of the Clapp-Griffiths and the tilting vessel; McCormick & Co., of Harrisburg, will put up a plant, and a part of the product of the works of the Glasgow Iron Co., building, will go into nail plate; the Pottstown Iron Co. are at work with a similar aim in view. In addition to these we learn that parties in the South have decided to use the invention developed by Messrs. Oliver and Witherow, with the object of making nails also.

In the aggregate the capacity of these two classes of plants is fully equal to the requirements for material of the whole nail trade of the country. It is impossible to give definite figures on this point, because conditions of trade must largely influence the diversion of material to or from the rail mills into this particular channel. It will be observed that the territorial distribution of the new steel works is such that it does not coincide with the relative importance of the different sections of the country as to their nail-cutting capacity. We believe, furthermore, that there is not a single new steel plant built or building in connection with a nail mill which has not a capacity to turn out metal in excess of the cutting machinery. The result of these facts will be that individual mills will be under the constant temptation to add new nail machines, and that those sections of the country which have not ready access to suitable steel will be sharply crowded.

The introduction of steel and the steps already taken to provide the material will have a tendency to concentrate the productive capacity of the country among a smaller number of very large mills, and may tend to shift further westward the seat of the nail industry. The New England mills, who once ruled the trade, found an active competitor in the works of Eastern Pennsylvania and New Jersey. The latter saw the Wheeling district rise to great importance, and now the latter is likely to make a contest for even a greater share. Wheeling has adopted the acid Bessemer, while other sections have gone over to the Clapp-Griffiths process. The introduction of the latter seems destined to counteract to some extent the tendency to concentration growing out of the erection of Bessemer works. The plants are more moderate in capacity, and have the advantage of being less dependent upon the accessibility to exceptionally pure raw materials. Some of the smaller nail mills will seek relief in purchasing plates from adjacent rail mills, but it would appear that this may only modify the evident drift to large steel nail mills. We have seen the same thing take place when the iron rail succumbed to the steel rail. We do not mean to assert that the change will be so rapid or so complete, but the history of that other great trade is not without its suggestions.

If it be true that centralization is to be the natural outgrowth of the introduction of steel for nails, then the manufacturers have before them an era of sharp struggles. It is acknowledged that the nail-cutting capacity is excessive even now. If the mills equipped with steel works go on adding machines for the sake of working up their own make of steel, then the prospect of an adjustment between facilities of supply and the demand becomes more remote. This danger may be avoided to some extent if the steel-nail mills resist the temptation of cutting up all their steel and make efforts to push a part of their product in other directions. Even now some of them have sought a trade for merchant steel and billets, and the current year holds out good promises in that direction. The steel mills whose principal work is the manufacture of rails are likely to be as busy as they can for this year, and some of them may not contest as vigorously as they might otherwise do for a trade to which they have been forced to give some attention during the depression.

Our Trade with Foreign Countries.

Some details have been published by the Bureau of Statistics on our trade with foreign countries during a series of years, which clearly show the fluctuations in values which have taken place during this time. Since 1880 our business with Great Britain has steadily declined. We exported to that country and received from there goods entered at the following valuations:

Fiscal year.	Exports.	Imports.	Total exports and imports.
1880.....	$458,796,497	$210,613,694	$664,410,191
1881.....	481,135,078	874,493,738	655,628,816
1882.....	408,347,185	195,588,692	606,935,847
1883.....	425,494,174	188,622,619	614,046,793
1884.....	386,238,898	162,549,608	548,787,984
1885.....	398,106,306	136,701,780	534,804,983

A still more striking change has been going on in the past five years in our commerce with France. As will be observed from the following table, our sales to that country have dropped from over $100,000,000 in 1880, the highest on record, to less than half that sum:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$100,063,044	$69,314,412	$169,407,456
1881.....	94,197,451	69,806,375	164,003,826
1882.....	80,010,818	88,897,606	168,908,424
1883.....	58,682,228	97,789,164	156,671,387
1884.....	50,899,885	70,842,413	121,742,298
1885.....	46,708,950	56,985,352	103,644,302

Germany has managed much better to keep up its volume of trade with us, as our imports indicate. In turn they have taken from us on an average the same amount of goods:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$57,062,263	$52,211,237	$109,273,500
1881.....	70,168,292	52,969,181	123,177,453
1882.....	54,228,958	56,308,542	110,597,495
1883.....	66,169,929	57,977,726	128,547,652
1884.....	60,608,069	65,019,163	125,622,222
1885.....	62,222,791	63,241,753	125,464,544

It is, of course, impossible to form any idea of how large a proportion of the goods coming from Belgian and Dutch ports, and how much we ship to them, is really a part of the German business. To both countries our exports have kept up very well, while our imports from there show a decided falling off. The following are the details for the last five years:

Fiscal year.	Exports.	Imports.	Total exports and imports.
1880.....	$34,154,180	$11,791,465	$45,945,645
1881.....	36,326,331	12,603,435	48,929,766
1882.....	25,107,013	20,999,668	46,106,681
1883.....	27,778,975	23,161,200	50,940,175
1884.....	22,588,655	10,922,160	33,511,815
1885.....	26,458,249	8,695,084	35,153,333

The Netherlands exhibit even more striking fluctuations in the values of our imports from that quarter:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$17,207,098	$6,944,087	$24,151,185
1881.....	26,352,507	5,802,306	32,154,813
1882.....	13,737,823	8,165,728	21,903,551
1883.....	18,919,583	12,258,733	31,178,316
1884.....	16,558,292	4,872,933	21,431,215
1885.....	16,754,360	5,652,749	22,457,012

With Italy our commerce has taken the following course:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$12,352,642	$10,317,686	$22,670,328
1881.....	9,018,875	11,643,987	20,662,862
1882.....	9,076,297	12,114,221	21,190,518
1883.....	10,313,558	11,909,658	22,223,216
1884.....	8,071,060	16,706,357	24,777,387
1885.....	11,974,417	14,492,908	26,467,325

Russia has taken less of our goods, falling off from $19,141,751 in 1883 to $7,762,746 in 1885, while our imports from there have remained about the same, near $3,000,000 a year. We exported to Spain about $12,000,000 worth of goods, but took less than for many years—that is, only $4,703,945 worth. In America Canada takes the lead with the following record for the last five years:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$30,775,871	$33,214,340	$63,990,211
1881.....	39,512,876	38,041,947	77,554,823
1882.....	38,569,822	51,113,475	89,683,297
1883.....	46,580,253	44,740,876	91,321,129
1884.....	46,411,450	39,015,840	85,427,290
1885.....	40,124,907	36,960,541	77,085,448

These figures show a decline in the movement in both directions.

A still greater falling off is exhibited in the figure covering our trade with Cuba, which we give below:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$11,225,699	$65,423,018	$76,648,717
1881.....	11,364,585	63,003,404	74,367,989
1882.....	12,134,824	70,450,652	82,585,476
1883.....	15,103,706	65,544,634	80,648,237
1884.....	10,910,758	57,181,497	68,092,250
1885.....	9,006,160	42,306,093	51,312,253

Brazil has held its own in spite of heavy declines in the value of some of the colonial products which it sends to us. So far as our sales to that country are concerned, they remain insignificant. The figures for the last five years are as follows:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$8,605,346	$51,970,090	$60,575,436
1881.....	9,252,415	52,782,536	62,034,951
1882.....	9,152,562	48,801,878	57,954,440
1883.....	9,252,094	44,488,459	53,740,553
1884.....	8,695,659	50,265,889	58,961,548
1885.....	7,317,293	45,263,660	52,580,953

The Mexican trade has always been more in our favor, and, although the results of last year's business are not encouraging, the elements of a fair and steady progress are at our command:

Fiscal year.	Exports.	Imports.	Total imports and exports.
1880.....	$7,866,493	$7,309,593	$15,076,086
1881.....	11,171,238	8,317,802	19,489,040
1882.....	15,482,582	8,461,899	23,944,481
1883.....	16,587,620	8,177,123	24,764,743
1884.....	12,704,292	9,016,486	21,720,778
1885.....	8,340,784	9,267,021	17,607,805

With the leading countries of Asia the balance of trade is heavily against us. We sold to China in 1885 $6,393,500 worth of merchandise, but bought from them $16,292,169. From Japan we purchased goods valued at $11,767,956, and exported to that country only $3,057,415. India took $4,110,368 of American wares, and sent us $17,699,257 worth of its products.

It will be noted from the details submitted that our trade with nearly every nation we have dealings with has suffered. We believe, however, that were it possible to ascertain the figures it would be found that the ratio of imports of manufactured goods to agricultural products has grown during the last few years, and that we gained in diversifying our trade.

Boiler Inspection.

Boiler inspection in New York comes up for discussion in the newspapers with remarkable regularity—perhaps too often to maintain a claim to novelty of treatment; but, at all events, it is of sufficient importance to merit the close attention of everybody. Just now, however, we find the old story referring briefly to the evident lack of facilities for boiler testing at the disposal of the examining bureau at Police Headquarters, the efficient work done under the circumstances, and then giving attention at greater length to the fact that all boilers, especially those used for heating, are not under the control of this bureau. This evidently has sorely troubled those immediately in charge. Efforts certainly have not been spared to arouse public sentiment in the matter, and to convey the impression that absolute freedom from danger could be secured only by extending the range of work of the present inspection bureau so as to include everything coming under the head of boilers for heating and power purposes. Practically there would be no objection to this extension, and it might be argued there would be no beneficial results either, were it not for the fact that there are many steam users who object to pay for something which they do not receive.

It must be remembered that every bolier under the control of the examining bureau is subject to a tax, presumably to defray the expenses of the periodical inspections which are made, and which, as experience has shown, are often of the most superficial character. So long as boiler users do this work independently of the bureau, with equal and perhaps greater satisfaction to themselves and safety to the public, there is no reason why the present state of affairs, so far as they are concerned, should not continue. If, of course, the precautions necessary to safety are neglected, prompt action should be taken. Results pointing decisively either one way or the other are not difficult to obtain, and to them close attention should be given in finally disposing of the matter.

According to the New York Inspection Bureau there are upward of 2000 boilers for heating not under their care hidden away in the cellars of buildings, and likely to cause explosions at any time by crowding on too much steam when the registers are shut off, or by neglecting to keep them properly supplied with water. However, with official inspection on the one hand and private inspection on the other, we think that the number of serious accidents on the two sides will be found pretty well balanced. Surely if the city inspectors desire the control of all these boilers they should make use of better methods to point out the dangers of private inspection systems than mere speculations as to what might happen.

The Rise in Lead.

Since the middle of last year pig lead has shown an improvement from about 3.60 @ 3.75 cents to 4.90 @ 5 cents, which it has recently reached. The rise has not been uninterrupted, nor has it been as sudden as the upward rush in 1879 from 2.87 to 5.50 cents, but it has been brought about by circumstances far less dependent upon speculation. Early in 1885 it became evident that, unless unforeseen events occurred, there would be a decline in the production of the country. One of the largest mines, the Horn Silver, of Utah, had exhausted immediately available ore supplies and would not market as much by nearly 10,000 tons in 1885 as it did in 1884. It was known, furthermore, that Leadville, while active as ever as a mining camp, would not turn out so much lead, and Idaho was not coming up to expectations. On the other hand the unprecedented competition between Leadville smelters proper, and the so-called "valley" smelters at Pueblo and Denver, it is true, put the lead ores at a premium, so that the miners were paid more money for the lead in their ores than the smelters could ever hope to get back for it. There were on the market, too, some very large blocks of lead, concerning the marketing of which there was considerable uncertainty. The most prominent of these was the stock accumulated by the Richmond Company, of Nevada. A further retarding influence must be sought in the effect of the continued complaint of poor business on the part of consumers. We know now that in this as in other metals, particularly so in iron, the volume of business was very heavy—that is, fully up to the average of past years. We know that the true ground for grumbling lay in the small percentage of profit rather than in the magnitude of sales. Thus, so far as lead is concerned, the year 1885 is characterized by a decline in the output and by the maintenance of consumption at fully the normal average.

On the question of supply we have now the official figures collected by the United States Geological Survey. According to a preliminary circular just issued, the output of 1884 compared as follows with preceding years:

	Desilverized lead. Short tons.	Non-argentiferous lead. Short tons.	Total production. Short tons.
1882.....	103,875	29,015	132,890
1883.....	122,157	21,800	143,957
1884.....	119,965	19,932	139,897
1885.....	108,692	21,975	130,669

The figures given under the first column are, we understand, the aggregate of the returns of all the desilverizing works in the country. These returns have been chosen by Mr. Kirchhoff as the basis, because they offer the surest means of reaching a correct total, since experience has taught it to be practically impossible to gather the statistics of production from the many and scattered smelters. The system adopted has its drawbacks, however. It may happen, and it did actually occur in 1885, that notable quantities produced in one year may be held by smelters and may be allowed to go into the channels of trade only some time afterward. Thus the lead production of one year may be underestimated, and that of the year following it may be made to appear greater than it really was. While the supply to the trade is correctly reflected in this way, the capacity of the mines to furnish the metal is not put in exactly the right light. The same reasoning might, of course, be made to apply to the ore as well as to the crude smelted product, and it might be urged that the true way of stating the lead production of the country would be to give the lead contents of the ores raised.

It is estimated that early in 1885 Leadville smelters had stacked in their yards about 2000 tons of base bullion produced in 1884, while now there is practically none. Therefore the desilverizers' returns overstate the 1885 product by that amount. This would indicate that the falling off in the yield of the American mines was not less than 10,000 tons in 1885, as compared with 1884. That deficiency has practically been made up from stocks now reduced to a comparatively low point, and we stand before the problem, not whether but how much lead we will have to draw from foreign countries to fill the gap between supply and demand. The latter unquestionably calls for at least 136,000 to 140,000 tons, and it may go beyond the latter figure if there is any general revival of business. So far as we can learn from reports from the mines, it is not likely that we shall for some time produce at a much heavier rate than we did in 1885. All the leading districts worked very near their full capacity in that year. It is true that the deficiencies from the carbonate ores of Leadville will be partly made up by the concentrates from the sulphuret ores of that camp, which are now being so successfully cleaned of their blende and pyrites by the new concentrator of the Colonel Sellers, the leading mine. The Madonna, in Colorado, and the Kelly Mine, in New Mexico, both of them carrying very large bodies of ore high in lead and low in silver, may be driven faster. The mines of Aspen and of other camps in Colorado, and the deposits of Utah, Idaho and Montana, may be driven under the stimulus of high prices, but it takes time to bring about such an increase. Equipment must be made more effective and development work be pushed. In the meantime a part of the supply must come from abroad, and henceforth quotations from the other side will possess an interest for us which they have not had for years past. The markets have been hardening there of late, and sales have been made impossible under 4.95 and 5 cents, when only a week or two since small lots were placed at 4.75 cents. We understand that considerable quantities of foreign lead have been ordered here, and they will probably be held in bond to await the time they will be called for. Consumers in this section are well supplied now, and for the next four weeks they will probably show little disposition to buy more than their immediate wants call for. To what extent a few weeks of dullness will weaken sellers remains to be seen. Usually persistent holding off brings about that result. It seems certain, however, that values are now established for some time to come on a considerably higher level than they have occupied for years, taking the average of months as the basis.

Practical Aspect of the Smoke Question.

After all that has been said about smoke production, and the many suggestions that have been made for its suppression, it may well be asked why it is that, in a general way, so little has been done to secure that economy and convenience which have been represented as the natural results of smoke prevention. There are several reasons to which we might look for an explantion, but of these only a few are worthy of closer attention. Smoke-preventing devices for which all requisite good qualities are claimed have certainly not been wanting in number, and boiler owners also have in a large number of cases been only too glad to avail themselves of their promised advantages. Thus every desired opportunity was furnished for testing the merits of the apparatus.

As the fundamental principle of all these devices is to supply sufficient oxygen to secure combustion as nearly complete as possible, it is evident that proper air distribution in the furnace is the object to which all attention has been and is being directed. Air, when admitted through the ash-pit and coming in contact with a mass of incandescent coal on the grate, yields its oxygen, which combines with the carbon of the fuel in the proportion to form carbonic acid. Passing through the bed of ignited fuel, however, it takes up another equivalent of carbon and converts the carbonic acid into carbonic oxide. Supposing the heat-units of the net combustible, when burned to carbonic acid, to be, say, 14,000, then, if burned to carbonic oxide, the heat-units would amount to about 4000, showing a difference of some 10,000 heat-units per pound of net combustible. This represents more than 70 per cent. of loss, or rather waste, for, it may be argued, air costs nothing and oxygen is all that is needed to effect the saving. The distribution of air above and below the fire is intended to counteract this loss, the air below the grate effecting the combustion of the coal and that above the grate furnishing the oxygen necessary to reconvert the carbonic oxide into carbonic acid. In burning a coal rich in hydrocarbons smoke is produced in large quantities, and if the particles of solid carbon are mixed with carbonic-acid gas while still in the furnace and at a high temperature they disappear as smoke, and convert the carbonic acid already formed in the furnace into carbonic oxide by yielding their carbon to the heated gas. The resulting waste might in a measure have been prevented by slow combustion and a proper supply of air above the fuel.

The quantity of air to be admitted above the fire and the best relative position for its admission, or, in other words, the proper introduction of oxygen, are matters of fur-

nace detail, however, which inventors of smoke-preventing devices have not always considered carefully. It has therefore not been at all uncommon that their arrangements, instead of giving increased efficiency, have proven positively detrimental to the pecuniary interest of the boiler owner who used them, and in such cases one trial was generally sufficient to discourage further experiments. Rather than bear the first cost of a so-called "smoke-preventing attachment," and then suffer further from its continued improper working, steam users returned to their original practices; hence the present state of affairs. Obviously it is a most unfortunate one for those who have really meritorious devices for sale, but with judicious management their ultimate adoption and extended use are almost certain. Practical demonstrations are convincing, and their results will always furnish the most satisfactory basis for judgment.

Special prominence has of late been given in England to investigations as to the relative merits of different fuels for steam-raising purposes and the appliances for using them. It is surprising to note, however, that, aside from some developments in the liquid fuel line, very little of practical value has been accomplished, and that in some instances the experience of certain inventors has been entirely ignored and no advantage taken of the results of their labors. This seems to have been particularly the case in the matter of coal-dust utilization and the burning of some of the cheaper kinds of coal, and accordingly we find that in some quarters vague speculations are indulged in as to the extent of the saving which may thus be effected. Much of the expense and disappointment connected with experiments in this line, and also in other directions, might readily be avoided by studying the records of past work, and energies now misspent could thus often be made to yield valuable and profitable results.

The Reply of the Eastern Pig Iron Association to the Manning Circular.

The Eastern Pig Iron Association, of which Mr. Henry S. Eckert is president and de B. Randolph Keim is secretary, sent a reply to the circular issued by Mr. Manning, the Secretary of the Treasury. That reply has now been published in full. After a few preliminary explanations the reply reads:

As iron ores vary infinitely in purity and in facility of mining, and must be necessarily located at various distances from the furnace, which produces a variance in cost of transportation, it is impossible to state the cost of ores generally. But something like an average may be reached in another way. It may be said that at the present price of iron no blast furnace can afford to run unless the cost of its ores is below 8 cents per unit—*i. e.*, $8 for the quantity of ore required to produce a ton of iron. In fact, very few can pay that much unless they have exceptional advantages in other respects, such as cost of fuel, nearness to market, cheapness of labor, &c. In this cost of $8 for the ores required to produce a ton of pig iron about $6.50 would be expended for labor, 50 cents for royalty to owner of mines and $1 for transportation. But this distribution would, of course, vary with the circumstances of the locality.

There is one class of ores of exceptional purity in regard to phosphorus which are used in making iron from which steel is to be afterward produced by the acid Bessemer process. These ores are comparatively rare in the vicinity of most of the great steel works, though found in most parts of this country in some quantity, and usually command a higher price for the special use mentioned. Furnaces situated near the coast often import foreign ores for this purpose in preference to paying high transportation charges from the mines of New York, New Jersey, Pennsylvania, Michigan, Wisconsin, Minnesota, Missouri, North Carolina and Tennessee, where the largest deposits of Bessemer ores are found. These foreign ores come mainly from Spain, Algiers and the Island of Elba. Recently they have also been brought from Cuba. Such ores, averaging 50 per cent. of metallic iron, can be laid down in the Atlantic ports for about $4 per ton, including the duty of 75 cents per ton. Much has been said by persons interested in foreign mines, or who wish to get foreign ores as cheaply as possible, about removing the duty on ores as an incentive to the manufacture of pig iron. As to that we wish to say, as makers of pig iron, we are opposed to any reduction of duty. It is not true, as has been asserted by those who ought to know better, that the importation of foreign ores benefits the native miner by enabling him to market a portion of his phosphatic product for mixture with an equal portion of the purer imported article for the production of Bessemer iron. Such mixture is unheard of in practice. Our native ores are as good, though not as cheap, as the foreign article, and every ton of foreign ore imported displaces just one ton of native ore.

We believe the only certain method to secure an adequate, regular and satisfactory supply of raw materials used in making pig iron is by the maintenance of adequate protective duties upon such materials as are produced at home. And, while anxious to prevent any legislation that would be damaging to our own manufacture, we have no desire to profit at the expense of kindred industries, notably so in the case of the principal raw materials of our own consumption, namely, iron ore and fuels. While some temporary benefit might accrue to us from free ore, soft coal and coke, such gain would work serious injury to the labor now engaged in the home industries, and we do not think it either expedient or just that American producers of coal, coke and iron ore should be compelled to compete with the much lower labor of foreign countries, while manufacturers of pig iron and nearly all finished materials enjoy a greater or less degree of protection. Further, we desire to put on record our belief that any advantage to manufacturers growing out of the admission of free raw materials that are produced in this country would be but temporary. Any considerable reliance upon foreign sources for the supply of iron ore (which is the foundation of our vast iron and steel industry) might at any time prove disastrous by reason of an interruption of shipments caused by war. Any crippling of American mining, causing stoppage even of the dead work involved in the intelligent development of our home ores, and making our iron and steel works dependent upon foreign supply of ores in time of war, would infallibly weaken our ability for national defense. So that the future interest and safety of the whole iron and steel manufacture, and of the country at large, is involved in this question, even if simple justice to the capital and labor in mining be not considered. Should unfavorable legislation result in crippling or closing American mines, it should be well understood that in case of war the supply of iron ore and coal would be totally inadequate to properly maintain the equipment of our land and sea forces. To reopen and make productive abandoned mines might take months, or even years.

Limestone.—This is used as a flux. It acts by combining at a high temperature with the silica and other impurities of the ore, forming a fusible slag which sinks toward the bottom of the furnace, but, being lighter than the melted iron, floats on it and is tapped off and removed. Pure limestone is a carbonate of lime. It is very rarely pure. Most limestones contain a mixture of carbonate of magnesia which is not deleterious, as it also acts as a flux. Besides this they contain silica (which is injurious when in larger proportion than 6 or 7 per cent.) and other substances in small quantities. The cost of quarrying limestone and transporting it to the furnace varies very much with circumstances, and the quantity required varies with the amount of silica or other impurity to be removed from the ore. The cost of limestone per ton of iron may be safely estimated at somewhere between 50 cents and $1 per ton. Of this cost 80 to 90 per cent. is for labor, 5 per cent. for royalty and the balance for transportation. Of this last (transportation) we believe fully two-thirds to be for labor.

Fuel.—This is either charcoal, anthracite coal, bituminous coal or coke, or a mixture of some of the last three. About two thirds of the charcoal is made by the furnace owner, and its cost depends upon the rate of wages and the length of the haul. It will average about 7 cents per bushel, and the quantity required is from 90 to 150 bushels per ton of iron. Anthracite, bituminous coal and coke are rarely produced by the furnace owner, but are bought in open market. In that case the cost at the furnace varies with the length of the transportation. It probably averages from $5 to $6.50 per ton of iron, according to location. Of this cost from 30 to 60 cents per ton of iron is royalty, the balance being labor and transportation, which last is probably two-thirds labor.

(*b*) *Cost of Labor.*—The actual cost of furnace labor, including handling materials and product, with superintendence, at a well-managed furnace will average $2 to $2 50 per ton of iron. Taking $2 as a standard, the items would be about as follows:

Superintendence, including clerical labor	$0.30
Cinder men (removing slag)	.30
Fillers (putting materials into furnace)	.70
Iron men (preparing beds and handling iron)	.20
General men (blacksmiths, enginemen, laborers, &c.	.50
Total	$2.00

The rates of wages range from 11 cents per hour for unskilled labor to $1.75 and $2.50 per day for skilled mechanics.

(*c*) *Operating Expenses.*—The principal item of operating expenses is labor, given above. The other items are incidentals and repairs. Incidentals include small daily repairs to furnace and machinery, as well as such items as feed for horses and oil for lubrication and light, &c. These, of course, vary every month, but will average 75 cents per ton of iron.

Repairs—Generally apply to large items, always required when an accident occurs, or the furnaces goes out of blast at the close of the campaign. The relining of the furnace with fire-brick and a thorough overhauling of the machinery are always necessary at the end of a blast before the furnace can be started up again. The amount of repairs required varies very much, and can never be determined till the furnace is cold and emptied to admit of inspection. Then the length of the blast varies from a few months to four or five years, and of course the quantity of iron against which the repairs are chargeable varies with the length of the blast. For these reasons the amount per ton due to cost of repairs can only be estimated while the furnace is in blast, but it is considered safe to charge 50 cents per ton for this item. In order to comply with the Secretary's request for itemized expenditures, we append a statement of the actual cost of making pig iron at four works in different parts of the country east of the Alleghany Mountains, which may be taken as typical establishments in the districts where they are located. This statement covers the years 1882, 1883 and 1884:

Tons iron made.	Fuel.	Ore.	Limestone.	Wages and salaries.	Incidentals.	Repairs.	Total cost.
I. 64,200	$5.15	$8.50	$0.07	$2.25	$0.43	.....	$17.30
II. 96,000	5.47	9.58	.42	1.82	.72	$0.69	18.70
III. 52,152	5.96	9.26	.82	2.10	.62	.19	18.95
IV. 90,500	6.50	9.00	.69	2.37	1.10	.50	20.16

The cost here given is absolute expense at the works, and does not include cost of sales and general office, commissions, interest, taxes, &c., which may be found treated hereafter. While it will be seen that the direct charge for labor at the furnace ranges from $1.82 to $2.37 per ton of iron, it must be emphatically stated that the other items—fuel, ore, limestone and repairs—are very largely, perhaps 90 per cent., made up of labor.

(*d*) *Interest.*—A furnace capable of producing with rich ores 100 tons of pig iron per day, with the necessary appurtenances, can be built for about $200,000. The same furnace working on lean ores might not produce over 70 tons per day. In one case the interest, $32.87 per day, would be 32⅞ cents per ton of iron. In the other case it would be 46 9/10 cents per ton of iron. Supposing the furnace to purchase all the materials used, and to carry unsold only six weeks' production, it would require a working capital of $75,000 at least, and $100,000 would be far safer. The interest on the smaller sum, $12.33 per day, would be 12⅓ cents per ton on a make of 100 tons, and 17 1/10 cents per ton on a make of 70 tons per day. Other elements of cost not covered by the above are taxes, insurance and commissions on sales, (about 1 per cent.), to which should be added the cost of reaching market. These items will at least average $1 per ton.

3. *Description of Buildings.*—As every iron furnace differs from every other in many respects, it is impossible to give other than a general description. The usual buildings are:

1. The furnace stack, costing	$30,000
2. The casthouse	10,000
3. The stockhouse, for storing ore and fuel, with track, &c	10,000
4. The engine-house	10,000
5. Boiler-house	5,000
6. Hot ovens	40,000
The machinery consists of one or two steam engines, with boilers and attachments, pumps, &c	80,000
The hot-blast pipes and cold-air pipes	10,000
The hoist or elevator for raising materials to the top of the furnace	5,000
Total cost, as above, about	$200,000

This does not include houses for workmen, which are sometimes absolutely necessary, nor the cost of land, nor does it include locomotives and cars, which in most cases are indispensable.

4. The imported article pig iron is subject to a specific duty of $6.72 per ton, or 3/10 cent per pound, but scrap iron which bears the same rate of duty is used in place of pig iron, and, as 1 ton of scrap is equivalent to 1¼ tons of pig, we consider that the duty is too low. The duty should be $8.40 per ton on scrap in order to equalize the two and protect our workmen engaged in the laborious occupation of puddling—*i. e.*, reducing pig iron to the form of wrought iron. We further assert that the duty on pig iron is entirely too low. It was reduced from $7 to $6.72 by the tariff act of 1883. It should now be advanced to $8, the figure recommended by the Cresson convention to the Tariff Commission in 1882, and scrap iron should be advanced proportionately.

5. As our reply is general and is intended to represent an average over the whole country east of the Alleghany Mountains matters of exceptional advantage or disadvantage on account of location are eliminated. We may properly state here that England and Belgium have an advantage over all localities in this country arising from the smallness of those countries and the materials for making iron. Although the freight rates on English and Continental railroads are at least double those on American roads, yet the haulage distance is so much less on the former that the foreign ironmaker has enormous advantages in home transportation. At the same time the ocean freights are so low that the 3000 miles from Europe to America cost no more than 150 miles on an American railroad. As to the wages paid in Europe generally, we know no better source of information than the recent book by Sir I. Lowthian Bell on the manufacture of iron, which contains full and authentic details on this subject. We may say generally that American wages in all departments of the iron manufacture range from 75 per cent. to 100 per cent. above those in corresponding circumstances in Europe.

In conclusion we would say that we know of no evasions of duties by importers of pig iron, nor do we believe that they exist. We are, however, directly interested in the importation of bar, sheet and merchant iron, because every ton of these contains at least 1½ tons of pig iron in a more advanced state of manufacture. Consequently, any evasion of the tariff on bar or sheet iron affects our business, and we believe that evasions of duties have been largely practiced on such articles. But we leave it to the manufacturers of wrought iron in its various forms to point out the source and remedy for such evasions, with which they are far more familiar than we can be.

We would here call attention to three instances, not indeed evasions, but cases of inadequate duties. Spiegel iron is classified as pig iron and pays the same duty, though it is worth $10 per ton more than pig iron. Ferromanganese, also classified as pig iron and paying the same duty, is worth from $20 to $50 per ton more than pig iron. The duty on spiegel iron containing 20 per cent. of manganese or less should be at least $12 per ton, and ferromanganese for every unit of manganese above 20 per cent. should pay an additional duty of 20 cents per unit of manganese, which would be, say, $24 per ton duty on the highest-grade 80 per cent. ferromanganese. Out of a total import of about 100,000 tons pig for the nine months ending September 30, 1885, about 50,000 tons were high-grade spiegel iron and ferromanganese, showing the utter inadequacy of the existing duty to enable home production of these special irons. Tin plate, which is 95 per cent. sheet iron, pays less duty than the iron sheets of which it is made, and, consequently, the manufacture in this country is killed.

We would respectfully protest against the expression in the Secretary's letter calling duties "taxes on the imported article." This word "tax" gives rise to misapprehension and misconstruction. It seems to sanction the doctrine of the free traders (which we utterly deny, and which we cannot believe that the Secretary admits) that every duty is a tax on the consumer. We would further respectfully protest against any agitation tending to lower the rates of duty. Business is now passing through a cycle of low prices. There are signs of improvement. But if we are to have a six months' discussion in Congress, with doubtful result, business will simply halt to wait for the outcome, as no man will buy to-day what he may get cheaper six months hence. We have no great confidence that our protest will be regarded, as our past experience has not shown us that Congressmen either know or care much for the wishes of the business community. We would further state as our deliberate conviction that any material reduction in the present duties on iron in its various forms will close three-fourths of the establishments in this country and transfer the manufacture to Europe. That may be desirable in the eyes of a pure cosmopolitan humanitarian, but as American citizens we cannot approve of it.

Wm. A. Ingham, chairman, president Rockhill Iron and Coal Co., Huntington County (Central Pennsylvania district); Frank S. Witherbee, Cedar Point Iron and Steel Co., Port Henry, N. Y. (Lake Champlain district); Henry S. Eckert, Henry Clay Furnaces and Topton Iron Co. (Schuylkill Valley district); F. A. Comly, president Longdale Iron Co., Longdale, Va., and treasurer Andover Iron Co., Phillipsburg, N. J.; Frederick Prime, vice-president Allentown Iron Co. (Lehigh district), Allentown, Pa.; J. Wesley Pullman, treasurer West Point Iron Co. (Hudson River district), Cold Spring, N. Y.

The Death of T. B. Coddington.

To the Editor of The Iron Age.—SIR: I beg the courtesy of your columns to pay a word of tribute to one of the loveliest characters it has been my good fortune to become acquainted with during an active business life of a third of a century.

At the meeting of the trade to pay respect to the memory of Mr. Coddington several spoke of him in terms of the highest eulogy; especially were the remarks of the chairman, Mr. James, exquisitely happy, earnest and complete, so much so indeed that nothing could be said to amplify or improve upon his well-chosen words. It is comforting to know that throughout his long life Mr. Coddington enjoyed the respect and honor which found expression in words on this sad occasion. Fortunately for the Church, he was a Church member; for his every-day life, business and private, illuminated Christian doctrine. The most valuable eulogy, then—best for the trade and best for the influence it will have—is to make permanent and fruitful in our hearts the general lesson of his beautiful life by following the sunny paths of kindliness and usefulness which he trod—traits of character which make it literally true to say that none knew him but to love him.

The country has lately sustained many losses of exceptional characters. Grant's reputation as a great soldier pales before the greatness of the man we became acquainted with during his illness; Seymour, the erudite, incorruptible statesman and magnificent citizen; Hancock, the superb soldier of guileless, generous nature, have awakened public grief and praise. Fortune placed these great men in conspicuous positions, made them the makers of history, but no less great, the peer of the best in every attribute which denotes nobility of nature and high capacity, was the genial unostentatious merchant, Thomas B. Coddington. J. B.

The Estimated Production of Revenue by the Morrison Tariff Bill.—A letter directed by the Secretary of the Treasury to Representative Morrison, chairman of the Ways and Means Committee, is accompanied by the following table prepared by the chief of the Bureau of Statistics, showing the reduction in duty effected by the Morrison bill, computed on the basis of the imports entered for consumption for the year ended June 30, 1885:

Estimated Decrease of Revenue.

Schedules of present tariff.	By transfer to free list.	By reduction of rates of duty.	Total.
A.—Chemicals	$857,812	$90,196	$448,006
B.—Earthen and glass ware	.....	1,038,511	1,038,511
C.—Metals	411,082	323,440	734,522
D.—Wood & wooden wares	1,079,622	2,945	1,082,567
E.—Sugar	.....	10,177,183	10,177,183
G.—Provisions	502,431	351,629	854,060
I.—Cotton	.....	366,706	366,706
J.—Hemp, jute & flax goods	1,805,388	743,581	2,548,969
K.—Wool and woolens	.....	1,315,155	1,315,155
N.—Sundries	1,498,459	106,882	1,605,341
Totals	$5,654,794	$14,576,226	$20,171,020

The lockout at the McCormick Reaper Works, Chicago, which began two weeks ago, was brought to a termination and the works were again started up on the 1st inst. A petition was circulated among the employees acknowledging the correctness of the firm's position, which, it is said, was signed by three-fourths of those formerly in their employ. When the bell sounded on Monday large numbers of workmen appeared carrying their dinner-pails, but they were taken in charge by the strikers, and many were prevailed upon to remain outside. Great crowds of strikers lined Burr avenue, facing the works, with the evident intention of intimidating any men expecting to go to work, and finally the police appeared and ordered them back. The dispersal of the crowd restored confidence in the minds of wavering ones, and in five minutes, according to Mr. McCormick's count, 350 men were at work in the various departments. Mr. McCormick opened the yards in person, and declared he would not shut down now if he had a dozen men to do the work. When the works were closed because the men were about to strike there were about 1300 men employed there. In the main the employees have been peaceable during their days of idleness.

The Madagascar treaty was ratified in the French Chamber of Deputies, on Saturday, by a vote of 450 against 29. The French virtually establish a protectorate, with a resident at the capital who shall preside over foreign relations.

All the molders of the various stove foundries of Troy on Saturday decided not to return to work until their wages are advanced 25 per cent. The number on strike is about 900. The New York 'Longshoremen's Union decided to boycott all foreign vessels which employ their own crews in discharging or taking in cargo, unless the captain of the vessel first pays a fine of 10 cents a ton for every registered ton into the treasury of the association.

WASHINGTON NEWS.

(*From Our Regular Correspondent.*)

WASHINGTON, D. C., March 3, 1886.

The majority of the Committee on Ways and Means having receded from their original purpose not to hear arguments on behalf of the different industries by assigning a day to each schedule, began to-day by hearing the representatives of the pottery interests. The representatives of iron and steel will be heard to-morrow. It is understood that quite a large delegation will be present, though some of those invited expressed a disposition to spend no time on the committee, but to bestow their arguments and their labors upon Members on the floor of the House.

IRON ORE, PIG IRON AND CHARCOAL IRON.

On Saturday the committee will devote their attention to iron ore and charcoal iron. It is expected that Hon. Smith M. Weed and M. S. Witherbee, of New York, representing the Lake Champlain iron-ore interests, and Hon. George H. Ely, of Ohio, representing the same interests in the West, will be present. The Committee on Legislation of the Eastern Pig Iron Association, consisting of W. A. Ingham, F. S. Witherbee, J. Wesley Pullman, Joseph E. Thropp and W. H. Ainey and Henry S. Eckert, president of the association, will have a special hearing on the same day.

The textile interests will also have a day. The rice interests will be heard on Monday, March 8, glass on Tuesday and sugar on Wednesday following. This will give two days for general hearings, after which no further information is wanted.

TEST OF STRUCTURAL MATERIAL.

The Committee on Manufactures are daily expecting to be called. The bill to create a commission to make tests of certain structural materials will then be reported and immediate action asked. A partial canvass of the House has been made, eliciting the fact that the Representatives of the States most largely interested in mechanical industries will very generally vote for it, whereas in sections where the necessity for great buildings and great works is small the sentiment seems to be favorable to making a little cheap capital by voting against the bill. The friends of the bill, however, are confident of its passage. There is now no doubt of the concurrence of the Senate. There is every prospect that this long-deferred and necessary measure will be carried through and the commission appointed, so that it can enter upon its important work. The advocates of this bill throughout the country have done their part in bringing the matter to the attention of Members of the House, and doubtless will be heard from should any of their promised support fail them.

MATERIAL FOR THE NAVY.

The Committee on Naval Affairs at its meeting on Monday partly upset the work it did at its last session, and by two votes, in which the Republicans were joined by Democrats, the chairman and Mr. Hewitt were beaten. At the last meeting, by a vote of 7 to 5, Mr. Hewitt's amendment to the bill, providing for new ships and permitting the Secretary of the Navy to purchase one engine abroad, was carried. Mr. Thomas, of Illinois, had made a motion to reconsider the vote, and to day he called it up. Armed with a letter from Chief Engineer Loring, written on Saturday night, he insisted that it was possible to produce the largest and best engines here, as the Navy Department was in possession of or could get working plans of the latest marine engines, which could be built, identically like the originals, without using a working model. By a vote similar to that previously cast the motion to reconsider was lost, and so was a motion to prevent the Navy Department from buying material abroad. Just at that point a letter was received from Secretary Whitney, in which he expressed his indifference to the permission to buy material or engines abroad, and declared that if the permission was given to him he would not make foreign purchases of engines. Upon the strength of this report Mr. Thomas moved to strike out the provision authorizing the Secretary to buy an engine of foreign manufacture. The motion prevailed, Messrs. Herbert, Hewitt, Norwood, Lore and Sayers, Democrats, voting nay, and Messrs. Wise, Ballentine, and McAdoo, Democrats, and Harmer, Thomas, Goff, Boutelle and Buck, Republicans, voting yea—thus changing the vote from 7 to 5 in favor to 5 to 8 against. Mr. Boutelle then offered an amendment to the section allowing the Secretary to buy shafting abroad, which permitted him to make such purchases only when it was impossible to buy the material at home. This was carried by the same mixed Republican and Democratic vote.

RECENT DECISIONS.

The following decisions under the metal schedule have been announced by the Secretary of the Treasury:

Rosin on metal spools must be considered an importation of rosin and metal, and as such dutiable at the rate of 45 per cent. ad valorem, under the provision in Schedule C, T. I., new, 216, for "manufactures, articles or wares, * * * composed wholly or in part of * * * metal."

Crop ends of blooms and billets of steel are dutiable at the rate of 45 per cent. ad valorem, under the provision in Schedule C, T. I., new, 183, for "steel not specially enumerated or provided for."

Certain so-called "button needles," which consist of sharp-pointed steel instruments with a flat loop at one end, which are used for fastening buttons on shoes, are dutiable at the rate of 25 per cent. ad valorem, under the provision in Schedule C, T. I., new, 206, for "needles, * * * all others not specially enumerated or provided for."

REPLIES TO SECRETARY MANNING.

Numerous inquiries are being received as to the distribution of the report of Secretary Manning and the accompanying replies of manufacturers and others to his circular of tariff inquiry. It is ascertained that the document will not be ready for several weeks, owing to additional matter.

THE

Iron Age Directory

AND

Index to Advertisements.

Special Notices.

NOTICE.

Sale—Stove and Hollow-Ware Works, Philadelphia.

On Monday morning, March 22d, 1886, at 11 o'clock, all the Real Estate, Machinery, Patterns, Stock and Good-Will of the Stove and Hollow-Ware Works of

STUART, PETERSON & CO.,

At the northeast corner of

Broad and Noble Sts., Philadelphia,

will be sold on the premises at public sale.

The property and plans of same can be seen on application at the works, where information respecting same will be given.

RICHARD PETERSON,
Surviving Partner.

BLACK RIVER FALLS,

WISCONSIN,

Offers splendid opportunities to parties with capital wishing to engage in manufacturing. Excellent water-power. Plenty of hard and soft timber. Rich Iron Mines recently opened. The largest Charcoal Iron Furnace in the United States just completed.

Extensive Granite Beds now being developed.

Write to secretary Board of Trade for full information.

TO Parties who would like to invest in a good, safe business: Any party or parties with means who would like to engage in a thoroughly staple business—to wit: the manufacture of Malleable and Gray Iron, Steam, Gas, Water Fittings and General Castings. We have an entire new plant, within four hours' ride of New York, consisting of three acres of land, two large foundries and large finishing shop, all of brick and fully equipped. Also a full and complete line of Patterns for Malleable and Cast Iron Fittings, with a large stock of goods on hand. Parties now owning the above have not sufficient capital to carry on the business. Works can be started and in full running order inside of ten days. Situated on two main lines of railroad, and shipping rates as cheap as from any main shipping point. The entire works were built in 1884, in the most substantial manner, and all especially adapted and intended for this business, being the most complete, best fitted and arranged of any in the country. The above will be gladly shown, and all other information given to persons desiring. Address for two weeks,

P. O. BOX 263,
Waterbury, Conn.

A Rolling Mill Superintendent or Manager, with a practical knowledge of Puddling and the finishing of all classes of Iron, and possessing a thorough knowledge of the Open-Hearth process, is open for an engagement. Has a practical knowledge of the manufacture of Boiler, Tank and Ship Plates, Fine Sheets for Stamping purposes, Galvanizing, &c. Also, all descriptions of Guide and Merchant Steel, Iron and Steel Forgings. Address "IRON AND STEEL," Office of *The Iron Age*, 77 4th ave., Pittsburgh, Pa.

FOR SALE.

One of the best located Hardware Stands in Southern Indiana, in a growing town of 5000, with good country trade. Only two other Hardware stores in the place. Stock invoices $4000.

Address S. H. CRANE,
No. 55 Lake St., Chicago, Ill.

FOR SALE.

A well-established Wholesale Hardware Business situated in a Western city of 40,000 population. Only one competitor. Can be purchased on time, or present firm will take stock if company is formed. Address "X.,"
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

FOR SALE.—The property known as the Stirling Chain Works, situated on the north side of Amherst Street, Black Rock, Buffalo, N. Y., No. 250, within two minutes' walk of the Belt Line Railroad Station. The works are in perfect order for immediate operation, and possess all the machinery requisite for the manufacture of Chain from ¼ inch up to 2½ inches. Facilities for receiving and shipping are admirable. For further particulars apply to

Messrs. JOHN OTTO & SON,
Buffalo, N. Y.

Descriptive circular sent on application.

FOR SALE.—A manufacturing business of Metallic Articles and Light Machinery in full working order and now running. Satisfactory reasons for selling. Price $6000.
Address "OPPORTUNITY," P. O. Box 285, New Brunswick, N. J.

TO HARDWARE OR STOVE MEN.

A first class Steam Fitter and Engineer, now engaged as foreman, making estimates, &c., wishes to arrange with some house who would like to carry a line of Steam and Plumbing Goods, and do Steam Heating, &c., in connection with their business. West or South preferred. Address "COMPETENT," Box 111,
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

Special Notice.

A gentleman acquainted with the Wholesale, Jobbing and Retail trade of the West (Hardware mainly), with 15 years' experience on the road, desires to connect himself with a large Western Manufacturer or Jobber in a capacity that will be remunerative to both. Address "G. B. R.," Box 235,
Boston, Mass.

Wanted.

A Partner in the Hardware business, with $10,000 capital, active or silent, guaranteeing 20 per cent. net profits, in a town centrally located in Dakota. Now doing a fine jobbing as well as retail trade. With additional capital trade can be increased to $100,000 per year. Best of references required. Address "XENIA."
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

TO CAPITALISTS AND MANUFACTURERS.

A rare opportunity to invest about $50,000 in an established Manufacturing Business where Agricultural and other Implements are made. Located in an extensive Agricultural district in a growing town of California. The business has been running three years; has an eligible site. Lead adjoins depot grounds of a prosperous Railroad. Address "CALIFORNIA."
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

SITUATION WANTED—By a first-class Metal-Pattern Maker; one that thoroughly understands the business and can furnish the best of reference as foreman or journeyman on Hardware and Brass or Malleable Iron.
Address "P. O. BOX 1676,"
Bridgeport, Conn.

Special Notices.

HAYDOCK & BISSELL,

WHOLESALE AUCTIONEERS.

Thursday and Friday,

March 18th & 19th, at 10 o'clock,

AT

83 Chambers and 65 Reade Sts., New York,

LARGE

TRADE SALE

OF

Table and Pocket Cutlery, Carvers and Butcher Knives,

first and second quality, desirable patterns, direct from the manufacturer. Full particulars in next week's *Iron Age*.

Trustee's Sale.

Offers for the purchase of the Real and Personal Estate of the Mansfield Elastic Frog Co. will be received for thirty days from and after this date, by the undersigned.

This property embraces the land, the fine manufacturing buildings and machinery therein on Congress Ave. and Daggett St., New Haven, Conn., and the good-will of a long-established mercantile and manufacturing business.

There are two distinct lines of business carried on by the concern—the manufacture of Railway Frogs, Crossings, &c., and the manufacture of Mechanics' Edge Tools. Either or both will be disposed of to suit purchasers, together with the Machines, Tools, Pulleys, Shafting and Appliances pertaining to the business.

For further particulars, please write for printed description of the property and list of the machinery. D. S. GLENNEY, Trustee,
New Haven, February, 27, 1886.

New York Machinery Depot.

BRIDGE STORE No. 16,

ON FRANKFORT ST.,

NEW YORK.

WE CARRY A FULL LINE OF

Second-hand Machinery

OF ALL KINDS.

Send for Lists and Special Prices.

FOR SALE.

The interest of a partner whose health has failed, in a large and very profitable manufacturing business, consisting of Wrought-Iron Pipe, Brass Fittings, &c., located in Chicago. The business will bear the fullest investigation, for which ample opportunity will be given. Sales increasing annually. Payment can be made to suit purchaser. For further particulars, address

R. L. TATHAM, Attorney,
45 Metropolitan Block, Chicago, Ill.

FOR SALE OR RENT.

Rohrerstown Rolling Mill; in good condition. Terms easy. Good location. Railroad siding Especially adapted for making Small Iron.

Address B. F. MONTGOMERY,
Lancaster, Pa.

FOR SALE.—A good, clean stock of Hardware, Tinware, also Tinshop, in Central Ohio. Splendid location. Will invoice from $2500 to $3000. Address "BOX 90,"
Sparta, Ohio.

For Rent.

Wrought-Iron Pipe Mill, with all Machinery.
E. A. SCOVILL, 121 Superior St.,
Cleveland, O.

WANTED.

A Clerk for a Retail Hardware store. Must be competent to take charge, make out price list and figure with architects. Address, stating age, references and salary expected, "R. & E.,"
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

A CHANCE.

An old-established Hardware and Tool Store for sale at a bargain; owners retiring from business. The best location in the city Capital required, from three to four thousand dollars.

Address "H. & T.,"
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

A first-class Pattern-Maker wants situation. Reference if required.
Address "O. D.,"
41 Duffield Terrace,
Brooklyn.

A Leading Manufacturing Concern

having opened a branch house in Chicago, would like one or two different lines to handle in connection with their goods. Having a good, live representative, it affords an excellent opportunity for any one desirous of being represented in the West.

Address "ENQUIRER,"
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

SITUATION WANTED as Salesman in Hardware Store. Have had five years' experience Address

"BOX 20,"
Hamilton, Ont.

WANTED—A Manager to take charge of Foundry; one who has had experience in the Range and Furnace line; is capable of designing same. One who has had practical experience in managing men. Address "MANAGER" Box 101,
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

POSITION WANTED by a Civil and Mechanical Engineer, age 30, thoroughly posted in design and construction of Bessemer Steel Works and Blast Furnace Plant; well up in calculation of Strains, Construction of Iron Buildings and Bridges.
Address "ENGINEER,"
1331 V St., Washington, D. C.

Special Notices.

ENGINES & BOILERS.

NEW AND SECOND-HAND.

The following new Slide Valve Engines guaranteed complete and first class:

One 18 x 24.	One 10 x 12.
One 10 x 24.	One 8 x 12.
One 12 x 16.	One 8 x 10.
One 10 x 15.	One 7 x 9.

Also One 12 x 30 Corliss Engine. New.
One 14 x 24 Adjustable Cut-Off Engine. New.
Also the following, Second-hand, guaranteed in good condition:
One Corliss Cut-Off, 18 x 42.
One " " 14 x 48.
Two Wright " 22 x 42.
One " " 18 x 32.
One Vertical Safety Power, 14 x 16.
One " " 5½ x 7.
One Corliss Beam Condensing Engine, 500 H.-P.
One 16 x 48 Adjustable Cut-Off.
One 10 x 30 " "
One 12 x 24 Plain Slide Valve.
One 10 x 20 " "
Two 9 x 21 " "
One 10 x 15 " "

Large stock assorted sizes new and latest improved Engines and Boilers. Plans, estimates and specifications furnished for Mills and Factories. Send for Circulars and Catalogues.

THE NEWELL UNIVERSAL MILL CO.,
10 Barclay Street, New York.

METALLURGICAL ENGINEERING.

I am prepared to furnish

PLANS, SPECIFICATIONS and ESTIMATES

AND TO

SUPERINTEND THE CONSTRUCTION OF ROLLING MILLS AND MACHINERY, REGENERATIVE GAS FURNACES, TUBE AND PIPE MILLS, ETC., ETC.

I represent the latest improvements in all the above branches.

M. V. SMITH, Metallurgical Engineer,
Rooms 16, 17, and 18 Bissell Block, Pittsburgh, Pa.

Second-Hand Tools.

We offer the following Tools at low prices:

1 Horizontal Boring Lathe. Will take 60 inches; adjustable heads. Very heavy. Strong Tool.

3 26-in. Lathes. New. Any length of bed. Very heavy. Strong Tools.

1 13 in. x 8 ft. Screw Cutting Lathe.

1 15 in. x 7 " " " "

1 20 in. Pond Drill.

1 30 in. x 10 ft. Lathe.

The above are all in excellent order, having been used by us up to date. We wish to replace them with tools of our newer patterns.

THE NEWARK MACHINE TOOL WORKS,
Newark, N. J.

FOR SALE,

ONE OF THE OLDEST FOUNDRIES AND MACHINE SHOPS IN SAN FRANCISCO, CALIFORNIA

(ESTABLISHED, 1866),

With facilities ample for making all kinds of machinery. The specialties of the works at the present time are Stationary and Compound Engines, Quartz Crushing and Amalgamating Machinery, together with a large line of Castings and Forgings, with the best facilities on the coast for repairing of all kinds. This is an opportunity seldom offered for any one wishing to engage in the Foundry and Machine business. Terms will be arranged to suit purchaser, or an exchange for city or country property may be effected. In case of purchasers incorporating, a fair proportion of the stock may be taken in payment. Ill-health being the only cause of present proprietor wishing to retire from the business. For further particulars, address L. M. STARR.
217 Fremont St., San Francisco.

For Sale, Manufacturing Sites on the

PITTSBURGH NATURAL GAS BELT,

250 acres of land on A. V. R. R., one-fourth of a mile beyond Pittsburgh city line. Natural gas has been located on this land by Philadelphia (Westinghouse) Co. A 9 and a 12 foot vein of coal on property. Three-fourths mile of river front. For particulars, address JAS. BOYD, Box 85, Allegheny, Pa., or W. A. HERRON & SONS, No. 80 Fourth avenue, Pittsburgh, Pa.

Wanted.

An Elevator in good order for Mill use, with necessary gearing complete. Speed about 60 feet per minute. To lift 2 to 3 tons 30 feet. Give maker's name, general description, size of plat form and lowest cash price. Address

P. O. BOX 1787,
Bridgeport, Conn.

For Rent.

FACING MILL, consisting of a run of six Mills (lower runners), Machinery Appertaining, in complete order, and supplying the trade daily. Further information inquire of

E. S. HERANCOURT,
Kindel and Central Aves., Cincinnati, O.

30 H.-P. CUT-OFF ENGINE AND TUBULAR BOILER on liberal terms; in use six months; located in W. Va.

Address "OWNER" Box 5,
Quakertown, Pa.

WANTED.—Position as Superintendent. Have had 16 years' experience in designing and superintending the manufacture of light machinery, sewing machines and hardware. Also in designing tools and special machinery for that class of work. Understand mechanical drawing, millwrighting and pattern making in wood and metal. Have also had charge of the planning and building of factories, setting engines, boilers, machinery, &c. Good references, and satisfaction guaranteed. Address "MILLWRIGHTING,"
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

TO LET, WITH POWER, one or more floors of a two story and basement brick building, 162 x 55 feet situated within seven minutes of freight depot and steamboat wharf.

Address "P. O. BOX 5,"
Bridgeport, Conn.

WANTED.—A situation as Local or Traveling Salesman. Have had nine years' experience in Heavy Hardware and four years' in Shelf and Builders' Hardware.

Address "M."
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

WANTED.—A situation by a young man with eight years' experience in a wholesale or retail Hardware Store; can speak French as well as English, and furnish the best of references.

Apply J. T. DOUGLAS,
246 Oliver St., Quebec, Can.

Special Notices.

SECOND-HAND MACHINERY

In Good Order. For Sale Cheap.

1 Engine Lathe, 48 in. x 20 ft. bed.
1 " 36 in. x 18 ft. "
1 " 30 in. x 16 ft. "
1 " 26 in. x 20 ft. "
1 " 24 in. x 12 ft. " Fifield.
1 " 20 in. x 8 and 10 ft. bed. Putnam.
1 " 17 in. x 8 ft. bed
1 " 15 in. x 6 ft. Porter. Rod feed only.
1 " 14 in. x 6 ft.
1 " 12 in. x 5 ft.
1 Planer, 12 in. x 11 in. x 3 ft.
1 " 18 in. x 16 in. x 3 ft.
1 " 20 in. x 20 in. x 4 and 5 ft.
1 " 36 in. x 36 in. x 7 ft.
1 " 30 in. x 30 in. x 8 ft.
1 " 24 in. x 24 in. x 5 and 6 ft.
1 Shaper, 10-in. stroke. Pratt & Whitney.
1 34 in.-B. G. Drill.
1 Lincoln Pat. No. 2 Miller.
1 Index Miller. Pond.
1 each 3, 4 Spindles, No. 0 Drills. P. & W. Co.
1 each Nos. 0, 1, 2 and 3 Screw Machines. Wire Feed. Pratt & Whitney.
1 No. 3 Screw Machine. Plain. P. & W.
1 375-lb. Drop Hammer. Beecher & Peck.
1 each 40 and 60 lb. Trip Hammers.
1 "Little Joker" Plating Machine.
1 No 3 Stiles Press.
10 Foot Presses, assorted.
8 Power " "
12 Punching and Shearing Machines, assorted.
2 Return Tubular Boilers, 45 H.-P.
1 Vertical " 50 H. P.
1 " Boiler each 8 and 25 H.-P.
2 Hoisting Engines, 8 and 10 ft.-P.
2 No. 2 Hand Milling. Pratt & Whitney.
1 Cutter Grinder. Grant & Bogert.
1 Horizontal Engine, 45-H.-P.
1 Vertical Engine, 10 H.-P.
1 Die Sinking Machine.
1 48-in Boring and Turning Mill. Pond.
1 40-lb. Bradley Hammer.
1 12-in. Shaper, 2 Tables. Betts.
1 No. 5 Root Blower.
1 Vertical Car Wheel Borer. Sellers.
1 Suspension Drill.

Also full line of New Machinery.
New York Agency TAYLOR MFG. CO., Engines, Boilers, &c. Correspondence solicited.
PRENTISS TOOL AND SUPPLY CO.,
P. O. Box 3362, No. 41 Dey St., New York City.

CHARCOAL FURNACE

FOR SALE.

TWO STACKS. Situated at Nicollet, Wisconsin.

For particulars apply to

ROGERS & CO.,
90 Dearborn St.,
Chicago, Ill.

FOR SALE.

An old-established Stove and House-Furnishing Business located on one of the leading avenues in this city. Now doing a good paying trade. This is a chance seldom offered. Reasons for selling, the advertiser is engaged in another business.
Address "PROMPT," Box 41,
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

For Sale.

Second-hand

DROPS and LIFTERS.

BEECHER & PECK,
Lock Box 122, New Haven, Conn.

For Sale.

Full set of Patterns for Steam Pipe Fittings, for Malleable, Brass and Iron Fittings, with Tools, Machinery for same. Will be sold very cheap.

Address JOHN B. MORRIS,
Cincinnati, O.

IRON MEN AND MANUFACTURERS, TAKE NOTICE.

THREE SALES, VIZ.:

Receiver's, Auditor's and Master's Sales, all on March 4th, 1886, at the mines of The Manganese Iron Ore Company, at Ogdensburg, Sussex County, New Jersey, of lands and mineral rights of The Manganese Iron Ore Company, Engines, Boilers, Machinery, Pumps, Tools, Diamond Drill, Buildings, &c. About 1500 tons of Washed Shot Ore, 2000 tons Unwashed, and 5000 to 6000 tons Lump Ore, 600 or 700 tons of Limestone, &c., all mined and ready for shipment.
Dated February 18, 1886.

FOR SALE.

Three-fourths interest in an old-established Hardware Business in a large Western City; doing a good business and A No. 1 location; sales from $40,000 to $45,000 per year, and could be increased considerably; stock all saleable and will invoice about $15,000; for further information, address "HARDWARE," Office of *The Iron Age*, 13 W. Third St., Cincinnati, O.

FOR SALE, CHEAP.

One 32 x 54 Horizontal Corliss Engine.
One Fair Harris Corliss Double Engines, 28 x 60.
One 16 x 48 Corliss Engine.
One 14 x 48 " "
Six Horizontal Tubular Boilers, 50-H.-P.
One Horizontal Tubular Boiler, 80-H.-P.
One No. 11 Sturtevant Blower.
One No. 4 " "
Two 50-inch Hawkins Exhausters.
D. B. CRUICKSHANK,
243 Dyer St., Providence, R. I.

FOR SALE

Owing to the death of Peter Bandey, Muncie, Indiana, is virtually left without an Architect or Planing Mill, and the Bandey Planing Mill is for sale at a bargain, on reasonable terms, together with machinery and residence. For full particulars, address

HEATH & LENNON,
Muncie, Indiana.

FOR SALE, MACHINERY.

Planer, 24 in. x 24 in., to plane 6 ft. New. $375.
" 27 in. x 26 in. " 8 ft. " $600.
Lathe, 18 in. x 6 ft. $156. 16 in. x 6 ft. ditto. $120. 2d-hd.
Lathe, with Turret for brasswork. New. $400.
Pulley Lathe, 36 in. x 19 ft., with Boring Attm't. $950.
New Speed Lathes. Heavy. $45, $50, $60, $75.
Back Geared Drill Press. New. 28-in. swing. Modern style. $175.
Rapid Nut Tapper. Heavy. 4 spindles. $100.
Improved Nut Machine, for 1-in Nuts and under. $500.
Ten large Improved Portable Forges at $20.
YORK & BENTON, Cleveland, Ohio.

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20 in. x 6 ft. " Whi comb.
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No 2 Stiles Press.
No. 3½ " "
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40 lb. Bradley Hammer.
100-lb. " "
400 lb. Steam "
50-in. Vertical Boring and Turning Mill. Phila
60-in. " " " " " Leffell.
108-in. " " " " " Niles.

Bolt Cutters, Milling Machines, Drills, Shapers, Lathes, Planers, &c., new, and also a line of second-hand machines not mentioned above.

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SITUATION WANTED.—As Foreman or Assistant Superintendent in a Machine Company. Have had practical and theoretical education. Understand my business thoroughly. Expectations not too high. Address "D. K.," Box 181,
Office of *The Iron Age*, 66 and 68 Duane St., N. Y.

Trade Report.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]
LONDON, WEDNESDAY, March 3, 1886.

Scotch Pig.—The market is a little steadier. We quote makers' brands as follows:

Coltness, alongside, Glasgow		47/
Langloan, "	"	44/6
Gartsherrie, "	"	43/
Summerlee, "	"	47/6
Carnbroe, "	"	44/
Glengarnock, "	Ardrossan	43/6
Eglinton, "	"	40/
Dalmellington, "	"	42/6
Shotts, "	at Leith	45/6

Carriage from Ardrossan to Glasgow is 1/ ₱ ton.

Cleveland Pig.—The market is a little steadier. We continue quotations, f.o.b. shipping ports:

Middlesboro', No. 1 Foundry	37/
" No. 2 "	36/
" No. 3 "	31 @ 31/6
" No. 4 Forge	30/6

Bessemer Pig.—The market is unchanged. W. C. Hematites are quoted 43/ for mixed lots, Nos. 1, 2 and 3, equal portions, f.o. b. shipping ports.

Bessemer Blooms.—The market is unchanged. We quote 7 x 7 inches, £6. 5/ @ £6. 10/.

Manufactured Iron.—The market is irregular. We quote at works:

	£	s.	d.	£	s.	d.
Staff. Ord. Marked Bars	7	10	0 @			
" Medium "	6	0	0 @	6	10	0
" Common "	5	10	0 @	5	15	0
Hoops, 20 W. G. and over.						
" Common Best	6	15	0 @			
" Medium	6	5	0 @	6	10	0
" Common	6	0	0 @	6	7	6
Sheets, 20 W. G. and under.						
" Ordinary Best	7	15	0 @	8	5	0
" Common	7	5	0 @	7	15	0

Steel Rails.—Market not so steady. We quote £4. 15/ @ £4. 17/6, f.o.b. shipping ports.

Old Rails.—Market unchanged. We quote Old D. H.'s, c.i.f. New York, 60/.

Scrap.—The market is unchanged. We quote Heavy Wrought, 50/; Bessemer Crop Ends, run of mill, 54/ @ 56/, c.i.f. New York.

Copper.—The market is a little higher. We quote Best Selected, £44. 10/ @ £45. 10/, and Chili Bars, £41 @ £41. 10/.

Tin.—The market is unchanged. Straits Tin, spot, is quoted £92. 15/ @ £93. 10/, and futures, £93 @ £93. 15/.

Tin Plates.—The market is unchanged. We quote:

Tin Plates, 10x14,	1st qual.	Charcoal	19/6 @ 21/6
"	2d "	"	18/6 @ 19/
"	1st "	Coke	17/6 @ 18/
"	2d "	"	18/ @ 13/6

Spelter.—The market is unchanged. We quote Ordinary at shipping ports, £15 @ £15. 2/6.

Lead.—Market unchanged. We quote Common English Pig, £12. 12/6 @ £12. 15/.

Freights.—Steam from Glasgow to New York, 7/6 @ 9/6.

Financial.

Office of *The Iron Age*,
WEDNESDAY EVENING, March 3, 1886.

The interruption of traffic by freezing weather and high winds, a fierce cutting of freight rates by the transcontinental lines, a check in the Morgan and Gowen negotiations for railway reconstruction, gold exports and a poor showing in our foreign trade for January—all these influences conspired to depress the tone of the speculative markets, and trade generally during the past week has been slow. The Southern Pacific Co., not to be outdone by rivals, on Monday made one general rate of $10 ₱ ton on all freight from San Francisco to New York, regardless of class, and freight moving in the opposite direction was charged $1 ₱ 100 lb, instead of $3, as heretofore, and 75¢ on freight previously carried for less than $3. The attitude of other lines is not yet as clearly defined. Pacific Mail peremptorily declined to renew the subsidy arrangement. The clipper lines around the Horn adhere to former rates, and expect to obtain a full share of the coarser freights.

The Stock Exchange markets have been sluggish and irregular during the week until near the close, when reports that Mr. Corbin, lately a large buyer of Reading, had joined the Drexel-Morgan syndicate, with the approval of President Gowen, gave the coal stocks much strength and advanced the entire list. On Thursday and Friday the market dragged, influenced by troubles in the Transcontinental Association. On Saturday dullness prevailed, which lower prices for coal only served to intensify. Railroad contentions formed the principal theme. The trunk lines, it was understood, had no part in the struggle. Monday presented no new features. On Tuesday the tone suddenly became strong and speculation was renewed, with the coal stocks most active. Report said Gowen had gained important advantages. To-day there was more confidence in the eventual settlement of the Reading troubles, prices advanced and transactions were on a larger scale. Quotations as follows: Burlington and Quincy, 137¼; Canada Southern, 44⅜; Canadian Pacific, 64¾; Cororado Coal, 25⅞; Central Pacific, 42½; Lackawanna, 132½; Erie preferred, 62½; Illinois Central, 141¼; Kansas and Texas, 29⅛; Lake Shore, 88½; Hocking Valley, 37½; Consolidated Gas, 109½; Manhattan, 127⅝; New York Central, 106⅞; New York and New England, 37¼; Jersey Central, 56¾; Northern Pacific preferred, 59; Oregon Railroad and Navigation, 103⅜; Oregon and Transcontinental, 32; Reading, 28½; St. Paul preferred, 125; Omaha preferred, 104¼; Union Pacific, 50½; Wabash preferred, 19¼; Pacific Mail, 51¾; Richmond and West Point, 34¼; Omaha, 40¾; Manitoba, 117¾; Western Union, 72¾.

United States bonds closed as follows:

	Bid.	Asked.
U. S. 3 per cents	101½	—
U. S. 4½s, 1891, coupon	112⅞	113
U. S. 4s, 1907, coupon	127½	127⅝
U. S. Currency 6s, 1895	126¾	—
U. S. Currency 6s, 1896	129¼	—
U. S. Currency 6s, 1897	131⅝	—
U. S. Currency 6s, 1898	135	—
U. S. Currency 6s, 1899	137	—

As the week closes a sudden change in syndicate movements is reported, being nothing less than the co-operation of Austin Corbin with the Drexel-Morgan party, with the approval of President Gowen, to reorganize Reading. The modifications in the plan of reorganization necessary to secure Mr. Gowen's allegiance have, it is understood, been suggested and informally agreed upon. The upshot of the whole is supposed to be a binding together of all the great coal interests. Chancellor Runyon yesterday refused the motion of F. B. Gowen to reopen the Vail case, and ordered the Philadelphia and Reading Railroad to turn over the property of the Central Railroad to the latter company. A new cut in coal prices indicates continued weakness, but some of the coal presidents profess to believe in prospects of harmonious action. In wheat there is much less doing, with current quotations about 1¢ ₱ bushel lower than a week ago and exporters well out of the market. In the dry-goods jobbing trade there has been a better demand, and the movement of goods since January 1 is much better than for the same period within the last three years. Despite the advanced prices in manufactured cottons the raw article has sold at the lowest point of 1878—8 1/16d.—and this without greatly stimulating our export demand.

The weekly bank statement shows a decrease as compared with last week of $5,763,100 in the surplus reserves, but the banks still hold $25,933,775 more than the 25 % required by law. At the same time last year they held a surplus of $49,120,650. In loans there was an expansion of upward of $1,500,000. The changes are supposed to be principally due to gold exports, which amount to about $1,305,000 by to-day's steamer, but have no effect on the market. The posted rates for bankers' sterling remain unchanged at $4.88½ for 60-day and $4.90 for sight. The market is quiet and steady. The character of the daily receipts at the Custom-House relieves all solicitude in regard to the Treasury gold supply, the proportion of silver certificates to gold and legal tender running regularly at a very low average. Money continues at the lowest quotations, as shown by the fact that the city comptroller was able to borrow freely at 1¼ % in anticipation of the payment of taxes. Commercial paper is in little better supply. We quote 60 to 90 days' indorsed bills receivable at 3 @ 3½ %; four months' acceptances at 3½ @ 4¼ %. Chicago papers notice that Eastern money is seeking employment in the West at low rates.

The Treasury statement for February is more favorable than had been anticipated. The reduction of the public debt is stated at $2,702,153, accomplished in spite of nearly $12,000,000 pension payments and large bond redemptions under the calls maturing January 1 and February 1.

The total clearing-house exchanges of 32 leading cities last week show an increase of 29.6 %, compared with 1885; outside of New York, an increase of 19 %. Four cities show a decrease, the greatest being San Francisco, 7.9 %. The largest gains are at Minneapolis, Omaha, Cleveland, New York, Philadelphia, Columbus and Detroit. The exchanges for the month of February show an increase of 30.1 %, compared with 1885; outside of New York, an increase of 36.5 %.

The imports at this port exclusive of specie during the last week were $3,825,281 above those of the previous week, the total valuation being $11,663,978, making the aggregate since January 1 $67,880,811, compared with $63,321,034 for the same time in 1885, and $76,229,863 in 1884. The exports are somewhat below those for the previous week, the total being $5,246,043, making the aggregate since January 1 $56,748,309, compared with $59,635,126 for the same time in 1885 and $53,551,833 in 1884. Included were 257,000 bushels of wheat, 13,376 bales of cotton and 6,214,000 gallons of petroleum.

According to the Custom-House reports the imports of specie at this port during the week were $431,629, making the total since January 1 $3,123,373, as against $3,137,865 for the corresponding period in 1885. The exports of specie for the week amounted to $1,500,805, making the total since January 1 $9,819,185, including nearly $2,500,000 in silver, against about $5,500,000 in each of the two years immediately preceding. The foreign commerce of the United States for the month of January was as follows, including all the ports: Imports, $50,127,073; exports, $63,448,153; balance of trade, $13,324,081. A comparison with last year shows that while the exports have fallen off nearly $21,000,000, as compared with January of last year, the imports have increased $5,000,000. Instead of an excess of exports amounting to nearly $39,000,000 as shown in January, 1885, we have only a balance of $13,000,000 in favor of this country in the month of January this year. The specie movement has also been more unfavorable to this country. The balance of trade for the seven months ending January 31 amounts to $52,571,070, against $137,888,063 for the corresponding seven months of the preceding year. The month of February is expected to show a still less favorable comparison.

Metal Market.

Copper.—The market is quiet, but firm. The contracts of the Lake companies with the French syndicate expire at an early date, and it is believed that the English market has been depressed by them to obtain renewal of the same at favorable terms. With that pressure removed an early recovery is looked forward to. We quote Lake Superior 11.40¢ @ 11.50¢, and Baltimore 10⅛¢ asked. The following are the list prices for Manufactured Copper: 16¢ @ 17¢ for new Sheet Copper, 16¢ for Braziers, 16¢ @ 17¢ for Bolts and 19¢ @ 20¢ for Bottoms; American Yellow Metal Sheathing and Nails, 11½¢; Rods, 15¢, and English in bond, 13¢. From London we learn by cable that the market is a little firmer.

Tin.—The market is steady and quiet, with a sale reported at the Metal Exchange at the close at 20.70¢, spot. Futures are offered at 20.75¢ @ 20.80¢, which we quote. It is urged that the statistical position here is unfavorable. The London market is reported as quiet. *Tin Plates.*—The market is fairly strong, as the result of favorable advices from the other side and light stocks both there and here. There is, however, no special activity. The market in London is reported unchanged. We quote for ordinary brands in large lines per box: Charcoal Bright, $4.85 @ $5.25; do. Ternes, $4.30 @ $4.50, and Coke Tin, $4.37½ @ $4.50.

Lead.—During the week there have been sales of a few hundred tons, chiefly Spanish Lead, at 4.95¢ @ 5¢, which we quote. The market closes fairly strong, with consumers pretty well supplied for the near future and holding off. Western manufacturers have bought abroad about 1000 tons of Lead, not 3000 tons, as reported in Western newspapers. Since it is not likely that they will be able to use it themselves, this move is believed to be a menace to the refiners. We discuss the situation editorially. There is no change in the London market.

Spelter.—The market continues firm, and it would be difficult to shade 4.50¢ for Common Western, which we quote. No change to report from London.

Antimony.—With a fair business doing prices remain 8¼¢ for Hallett's and 9¼¢ for Cookson's.

John Russell Young, ex-minister to China, deprecates any action on the part of the United States with reference to immigration which may impair our commercial relations with that country. He says: "The emigrants whose presence in California leads to so much discussion do not come from China, but from Hong Kong. The Chinese authorities have as much control over emigration from Hong Kong to San Francisco as they have over emigration from Liverpool and Belfast to New York, and no more. Hong Kong is a British possession. The Secretary of the Treasury has it in his power to end the business by insuring a careful obedience of existing laws. The Secretary of State will find the Government of Hong Kong willing to unite in any serious effort we choose to make to control emigration from that colony. And until the Administration has exhausted the powers conferred upon it by law and treaty—powers which China has accepted and understands—any such legislation as is proposed looking to the abrogation of the Burlingame and other conventions can only be regarded as a wanton discourtesy to China, and a confession that we cannot insure obedience to our own laws."

The observatory at Central Park, New York, reports that at 10 minutes to 4 p. m. on Friday the force of the wind was 37.5 pounds per square foot, which is equivalent to a velocity of 86.6 miles per hour. The water at Sandy Hook was 18 inches lower than before for many years. At Harrisburg, Pa., the stand-pipes of the Lochiel Iron Works were prostrated; also a bridge near Havre de Grace, Md., and roofs were taken off in every direction.

One of the questions raised under the recent Supreme Court decision as to appraisement of duties on coverings is as to whether copper cylinders containing carbonic acid are to be admitted free as coverings, the cylinders being many times more valuable than the acid which they contain.

The New York Senate started an inquiry into the business of the Dock Department. The Dock Commissioners have control of all the wharf property of the city, make their own contracts for the dockwork, or do the work of construction themselves in case of a failure of contracts.

The new arsenal of the Twelfth Regiment, in New York, is nearly completed. It has a drillroom 200 by 175 feet, spanned by steel trusses said to be the finest and largest of this kind ever used, and in other parts of the structure are fine specimens of work, including forged-iron gates with backings of crucible-steel plates, bullet proof steel shutters, &c. The cost of the structure will be, it is estimated, about $270,000, the appropriation having been $290,000.

Trade Report.

New York Iron Market.

American Pig.—The market has been quiet and featureless, business being confined to small lots for near-by delivery. There is no undue pressure to sell, not even No. 2, which is a little more abundant. Production and consumption appear to be very well balanced at the moment, but the knowledge that there is additional capacity available at the slightest indication of a more urgent demand is causing consumers to move without any anxiety as to the future. Some of the Southern Iron has gone into store. While the market is steady and firm, an effort recently made by a leading company to demand higher prices for No. 1 Foundry on small lots to cover current demand was abandoned because it uniformly led to the loss of the business. We quote for standard brands, tidewater delivery, $18 @ $18.50 for No. 1 X Foundry, $17 @ $17.50 for No. 2 X Foundry, and $16 @ $16.50 for Gray Forge. Outside brands are 50¢ below these quotations.

Scotch Pig.—A moderate amount of business is being done. We quote nominally as follows for small lots: Coltness, $20.50 @ $21 to arrive; Gartsherrie, $20 @ $20.50 to arrive; Shotts, $20.50 @ $21 to arrive; Carnbroe and Glengarnock, $19.50 to arrive; Summerlee, $20 @ $20.50 to arrive; Dalmellington, $19 @ $19.50 to arrive; Eglinton, $18 @ $18.50 to arrive, and Clyde, $18.50 @ $19 to arrive.

Bessemer Pig.—The only transaction we hear of is the sale of a 5000-ton lot of Domestic Bessemer Pig, from all Foreign Ores, on private terms. Foreign Bessemer is weaker and lower offerings have been made. We quote nominally $19 @ $19.25, ex-ship. Domestic is cheaper, delivered at mill.

Spiegeleisen.—There is no demand, and the market is weak; 20 % English Spiegeleisen is nominally quoted $27, and German $26.50. Ferromanganese is quoted $67.50 @ $68 for 80 %.

Bar Iron.—The market is very quiet, but as yet has not exhibited any signs of weakness. It is urged that the decline in Old Rails, if it continues, may have an effect upon Bar Iron. On the other hand, carbuilders and locomotive works are busier and are taking more Iron. We quote for delivery here in round lots: Common Iron, 1.65¢ @ 1.70¢; Medium, 1.70¢ @ 1.75¢, and Refined Iron, 1.85¢ @ 1.9¢, with half extras. Store prices are 1.75¢ @ 1.80¢ for Common, 1.85¢ @ 1.90¢ for Medium, and 1.9¢ @ 2 2¢ for Refined.

Structural Iron.—No contracts of any consequence have been closed during the current week. Manufacturers are figuring on considerable bridge-work, and the prospects are that considerably more business will be done this year than last in that direction. We quote for Angles 2¢ @ 2.10¢, delivered, and Tees at 2.35¢ @ 2.40¢ for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.25¢ @ 2.4¢ for Angles, and 2.6¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

Plates.—We quote for round lots: Common or Tank, 2¢ @ 2.1¢; Refined, 2¼¢ @ 2¾¢; Shell, 2.4¢ @ 2½¢; Flange, 3.4¢ @ 3½¢; Extra Flange, 4¢ @ 4¼¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2½¢ at mill asked; Boiler, 3¼¢ for Shell, 3¼¢ @ 4¢ for Flange, and 4¼¢ @ 5½¢ for Extra Flange and Fire-Box.

Merchant Steel.—Quotations for the range from ordinary to good grades are as follows: American Tool Steels, 7½¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13¢ @ 15½¢; common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Round and Flat Spring, 2.6¢; Round-Edge Tire, 2.6¢; Square-Edge Tire, 2.9¢; Toe Calk, 2.7¢; Sleigh Shoe, 2.8¢; Open-Hearth and Bessemer Machinery, 2.8¢, with freight allowance.

Steel Wire Rods.—The market is quiet at nominally $41.50 @ $42.

Steel Rails.—A number of sales of round lots are reported during the week, without any details being given, however. The majority of the mills find a good deal of difficulty in taking orders for early delivery, and some of them can make it possible only by making adjustments with other customers, providing for extension of time of delivery. We quote the market $34 @ $34.50 for early delivery.

Scrap.—The market is weaker. Foreign, ex-ship, offering at $20 @ $20.50. We hear of no sales.

Crop Ends.—These are scarce, and an order for 2000 tons remains unfilled.

Rail Fastenings.—We quote Spikes nominally 2.40¢; Angle Fish Bars, 2¢; Bolts and Square Nuts, 3¢, and Bolts and Hexagon Nuts, 3.25¢, delivered.

Old Rails.—A decline in the Pittsburgh market has led to the offering of lots of Foreign Rails destined for Western consumers for resale here, and with large blocks offered, notably of English T's and Southern lots, has depressed this market and has frightened buyers out of it. We note one sale of 500 tons English Double Heads, March shipment, at $21.25. American T's are offered at $21.50, without finding buyers. We quote nominally, English D. H's, $21.50.

Messrs. Witherbees, Sherman & Co. have opened an office in the Manhattan and Merchants' Bank Building, No. 40 Wall street, in this city. This office will be a branch of their sales department only, and therefore all remittances and shipping directions should be forwarded directly to their main office at Port Henry, N. Y. Their sales agency, now represented there by Messrs. Hotchkiss & Nichols, of 37 Platt street, has been discontinued.

Messrs. Witherbees, Sherman & Co. have announced the prices of the Ore of the Old Red Mine and of the Port Henry Iron Ore Co.'s 21 Mine as follows, delivered at wharves at Port Henry, N. Y.:

	Per ton of 2240 lb.
Selected Lump for Puddling	$4.00
Screened Ore for Forges	3.25
Furnace Ore	2.50

These are the same prices as those of last season.

Metal Exchange.

The following sales are reported:

WEDNESDAY, February 24.

400 tons Pig Iron Certificates, March.....$17.50
300 tons Pig Iron Certificates, March.... 17.75
10 tons Tin, March.. ..... 20.70¢

THURSDAY, February 25.

5 tons Tin, March..... 20.75¢
10 tons Tin, March.. ..... 20.80¢

SATURDAY, February 26.

10 tons Tin, March..... 20.70¢

WEDNESDAY, March 3.

5 tons Tin, spot..... 20.70¢

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, March 2, 1886.

Pig Iron.—The market has not shown much activity, so far as new transactions are concerned, but increasing firmness in prices has been developed, with strong indications of a general advance at an early date. The position is a very peculiar one, regarded from almost any standpoint. There is an unusually large production, and with that quite a scarcity, and yet no excitement in prices and no great urgency to buy. The shipments of gold, the unfavorable exhibit of our export trade, the tariff agitation and matters of that kind all have an unfavorable influence for the time being, but the continued large consumption of Pig Iron will be certain to outweigh all these considerations in the long run. The probability is that the country is consuming nearly as much Pig Iron as it ever did, and there is every indication that it will show considerable increase within the next 60 days. No very material advance in prices is expected, because of the large capacity for production which is still unemployed, and, in addition to that, Foreign Iron would begin to come in at $1 or $2 ℔ ton over to-day's quotations. On the other hand, cost of production has increased to a point that very few furnaces remain idle that could be worked at a profit at present prices. Taking everything into consideration, therefore, the chances are strongly in favor of higher prices, and with the renewal of contracts by large consumers it is not improbable that an entirely new list of quotations will be adopted. Prices to-day are supposed to be $16.50, $17.50 and $18.50 at tide for the three grades, but when it comes to actual business $17, $18 and $19 is about the best that can be done, and the smaller the order the more acceptable it is to the seller. Choice brands of No. 1 readily command $20, several sales have been made at a higher figure, and it looks as though everything of a desirable character was working up to that point. A very large business has been done in Bessemer Iron, and at $18 at furnace for No. 3 the leading producers are pretty well sold up.

Foreign Iron.—No large amount of business can be said to have been positively closed, but it is not unlikely that some options that are out will be accepted by buyers. The asking figures are $19.50 @ 19.75 for Bessemer, and $27 @ $27.50 for 20 % Spiegel

Blooms.—There has been a considerable business done in Steel Blooms, both Foreign and Domestic, but it is almost impossible to quote prices except in a general way. Slabs for Nail Plate have been sold at $30 at tide for Foreign and $30 at mill for Domestic, and from that up to $35 for higher qualities, while special grades for boiler plates and other uses requiring high tensile strength have been sold at from $38 to $40. Other Blooms are as follows, and are firmly held: Charcoal Blooms $53 @ $54, Runout Anthracite, $43 @ $44, Scrap Blooms, $34 @ $35, and Ore Blooms, $35 @ $36.

Muck Bars.—The demand has been well maintained, and, although there is no quotable change in prices, the advantage appears to be in sellers' favor. We quote $29 @ $29.50 at mill.

Bar Iron.—There has been a pretty fair demand on the whole, but no improvement in prices can be noted as yet. Some good-sized orders have been on the market, but bids have been at low prices and it is doubtful if the average on the business taken was equal to the figures ruling earlier in the month. The mills are very full of work, however, and, as there is every indication of a heavy demand during the next 60 days, it is hardly possible for prices to continue as they are to-day. Cost of production is increasing, and with a continued upward tendency in pig iron, &c., there is every reason to expect a similar movement in the finished article. Sales at 1.85¢ @ 1.9¢ for Best Refined Bars, and 1.7¢ @ 1.75¢ for medium quality. Skelp Iron has been taken in liberal quantities at about 1.85¢, sellers asking a shade more, say 1.87½¢.

Plate and Tank Iron.—No special movement can be noted in this department, although the mills are all busy on work of various kinds. The outlook is quite encouraging, the only unfavorable feature being that prices are too low. A large amount of business is believed to be near at hand, so that, while no advance is asked at the moment, there is absolute firmness at the figures quoted a week ago, viz: Ordinary Plate, 2¢ @ 2.1¢; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—There is nothing of special interest to report in this department. Mills are well employed, and orders from week to week are about equal to deliveries. No large contracts have been placed of late, but the current demand from shipyards, bridge builders and architects has been sufficient to maintain constant activity, while the outlook promises still better things in the near future. Prices are unchanged, but firm at last week's quotations, viz.: 2¢ @ 2.05¢ for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There has been quite an active demand for Sheet Iron, all classes of buyers having been in the market during the past week or 10 days. There are still numerous inquiries, and large lots would be taken at very slight concessions, but even at current rates manufacturers see very little margin for profit, and, as cost is gradually creeping up, there is more disposition to advance than has been seen for a long time past. Meanwhile for immediate deliveries quotations are about as follows:

Best Refined, Nos. 26, 27 and 28	4 ¢
Best Refined, Nos. 18 to 25	3¾¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28	5 ¢
Best Bloom Sheets, Nos. 22 to 25	4½¢
Best Bloom Sheets, Nos. 16 to 21	4 ¢
Blue Annealed	3 ¢
Best Bloom, Galvanized, discount	60 %
Common, discount	65 %

Steel Rails.—The market cannot be called active, although there is quite as much business as manufacturers can comfortably handle. Sales to date under the combination are understood to aggregate about 875,000 tons, and there are still some large orders to be placed, so that there is every reason to expect full employment the year through. Prices are steady and unchanged, $34 @ $34.50 at mill being inside figures for large lots, and $34.50 @ $35 for others.

Old Rails.—The demand has fallen off considerably, and, while there are plenty of sellers, there are very few buyers, particularly for shipment. Spot lots are scarce. Foreign, to arrive, offered at $21.50 for T's and $22.50 for Doubles; firm offers are hard to get, but business could probably be done at $21 and $21.50 @ $22 for lots nearly due at this port.

Scrap Iron.—Market a shade easier; cargoes of Foreign offered for prompt shipment at $20.50 @ $21; bids hard to get at over $19 @ $19 50. Spot lots sell at about the following quotations: No. 1 Wrought Scrap, $20 @ $22; No. 2 do., $14 @ $15; Turnings, $14 @ $14.50; Old Car Wheels, $16 @ $16.50; Old Steel Rails, $20; Fish Plates, $23.50 @ $24.50; Cast Scrap, $14.50 @ $15; do. Turnings, $10 @ $10.50.

Wrought-Iron Pipe.—Matters in this market continue in a very quiet state. The demand is light, and nothing of importance is expected at this season. Prices, however, remain firm, and the tone of the trade is confident as to an early and good spring business. Quotations are as last reported, discounts for large lots being about as follows: Lap-Welded Black, 60 %; Butt-Welded Black, 42½ %; Butt-Welded Galvanized, 32½ %; Lap-Welded Galvanized, 42½ %; Boiler Tubes, 55 %.

Hardware.—The severe weather has caused a lull in the trade with near-by dealers, but business through travelers and mail continues brisk. The large jobbing houses are quite busy, notably in goods pertaining to outdoor work, as Shovels, Rakes, Barn Fittings, &c. Shelf Goods are not moving quite so freely. The advanced prices are well maintained, and reports of cutting are very rare. There are but few articles (and these are principally in Brass) that have not been affected, either by an advance or stiffening in price, by the business of the past few weeks. Dealers, who are still holding off, are taking some risk as to future prices, for manufacturers will be forced to put prices still higher by reason of the greater cost in material and labor which is likely to prevail.

Shafting, Pulleys, &c.—Manufacturers in this line were the first to feel the effects of the improvement in business. During the fall of 1885 orders began to come in, and through the winter the works have had all they could readily do. Sufficient work is in hand now to keep them busy for some months ahead. Competition keeps prices to minimum figures, and there has been no very great advance as compared with six months ago. Otherwise the situation is very satisfactory and encouraging.

Nails.—Prospect of the Western mills getting into operation in time for the spring trade has had some effect in checking inquiries from that section. It is hinted there would have been an advance in price in this market ere this but for the uncertainty as to the situation in the West. Prices are very firm, stocks light, and sellers are not anxious to force orders at present rates, which are as last quoted, viz.: $2.50, with 10¢ ℔ keg rebate for large lots.

Files.—There is continued activity, the demand being strong and steady. There is very little being made for stock, the factories running almost exclusively on orders, some working overtime. Within the week another slight advance has been made, caused by the increase in price of steel. The several advances since December last are fully maintained, as dealers and consumers realize the necessity for higher prices.

Machine Tools.—Though there is rather a quiet feeling, manufacturers report steady business, with a fair outlook for the near future. Orders are largely for special work, each customer having some idea of his own to be carried out in construction. This feature tends to retard any activity in making stock and confines operations to immediate orders, which, however, are sufficient to assure plenty of work for some time ahead.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., March 2, 1886.

No important change to note in the general business situation; in some respects the outlook is more encouraging, while in others it is not. The Coal and Coke strikes being over, labor is more fully employed, and it is probable that the Nail strike will be brought to a close before long, as both the manufacturers and the nailers are becoming anxious to get to work again. The river Coal trade of Pittsburgh has not been in such a bad condition for many years, if ever; the down-river markets are overstocked, and at some of them it is hard to obtain lay-down cost. At Cincinnati Pittsburgh Coal is being sold at 5¢ @ 6¢ ℔ bushel, which is lower than it has been for over 20 years, and scarcely covers the actual cost of putting it there. The only salvation of the Coal trade of Pittsburgh is to have the United States Government buy out the Monongahela Navigation Co. and make the river free of tolls.

Ores.—There is rather more doing, and the prospect is that there will be a better demand later on as the furnaces started up use up what they had on hand. There is more or less talk of an advance in freight rates on Ores, but it is not generally credited, as furnacemen are now in condition to carry more Ore, and the Ore companies say they can take no less and hold their own. The rate on Ore from Cleveland to Pittsburgh remains unchanged at $1 25 ℔ ton.

Pig Iron.—The general position of the market does not vary much from that of a week ago. Nearly all the furnaces in this vicinity have had to advance the wages of employes 10 %, and apprehensions, whether well founded or not remains to be seen, prevail of an advance in the price of Coke. Pittsburgh is regarded as being one of the cheapest markets in the country, and our home furnaces have outbid competition, as many of the furnacemen who ordinarily dispose of their product here write to their agents that they can do much better at home. One of our brokers representing Eastern furnaces has sold little or no Iron here for more than a year, and furnacemen in the Shenango and Mahoning valleys are selling the most of their product to go to Cleveland, Chicago and other points West. This being the case, there is not much prospect of a decline; nor, on the other hand, is there much show for higher prices, as consumers complain that even now the raw article is bringing more money relatively than can be obtained for the products. We quote prices as follows:

Neutral Gray Forge	$16.25 @	$16.50,	4 mos
All-Ore Forge	17.50 @	18.00,	4 "
White and Mottled	15.50 @	16.00,	4 "
No. 1 Foundry	18.00 @	18.50,	4 "
No. 2 Foundry	17.00 @	17.50,	4 "
Charcoal Foundry	22.00 @	24.00,	4 "
Cold-Blast Charcoal	24.00 @	27.00,	4 "
Bessemer Iron	20.00 @	21.00,	4 "

Muck Bar.—There has been a considerably improved demand within the past couple of weeks, and the market may be quoted steady at $28, cash, at mill.

Manufactured Iron. — Manufacturers generally continue to report trade as being unsatisfactory and that in addition to a light demand prices are unremunerative and irregular. The reports from Chicago, St. Louis and other points of distribution continue less favorable, but it is hoped that there will be an improvement both in demand and price before the close of the present month. The former will have to precede the latter. While first-quality Iron is still quoted on a basis of 1.70¢ @ 1.75¢ for Bars, it is stated that it can be had for less for desirable orders. A good demand for Skelp Iron is assured, as the Pipe mills, it is now almost certain, will have all they can do this year; but with this exception the outlook at present is not very encouraging.

Wrought-Iron Pipe.—This growing and important interest continues much the same as noted for some time past; the mills are all in operation, and the outlook for a good trade all this year never was better. The next meeting of the Wrought-Iron Pipe manufacturers will take place at New York on the 11th inst. Prices unchanged. Discount on Black Butt-Welded Pipe, in carlots and upward, 45 %; less than a carload, 42½ %; Galvanized, in carlots, 35 %; less than a carload, 32½ %; Black Lap-Welded Pipe, in carlots, 62½ %; less than a carload, 60 %; Galvanized do., in carlots, 45 %; less than a carload 42½ %; Boiler Tubes, 55 % off; 2-inch Oil-Well Tubing, 13¢ ℔ foot net; 5⅝-inch Casing, 40¢; 8-inch Drive Pipe, $1.30.

Nails.—As neither party has asked for a conference, the situation as regards the strike remains unchanged. The feeling obtains, however, that in some way or other the strike will be brought to a close now that a break has been made. Both the manufacturers and nailers here in Pittsburgh are tired of the strike—the former, having been out of the market since last summer, have lost a good deal of trade, and the latter, by being deprived of employment for nine months, have also suffered. A conference is likely to be called any day.

Old Rails.—Dullness still prevails; we hear of Old Iron Rails being offered at $23.50 without finding takers. Consumers appear to have all they want. It is stated on good authority that on all the lines of the Pennsylvania Co. west of Pittsburgh there will not be 500 tons of Iron Rails taken up this year. Old Steel Rails are still quoted at $22.50 @ $23 for Mixed and Short Lengths, $23.50 @ $24 for Long.

Steel.—The Steel mills are as a rule pretty fully employed and trade is all that can reasonably be expected. Best brands of Refined Cast Tool Steel, 8½¢; Crucible Machinery, 3¾¢ @ 4¢; Open-Hearth do, 2½¢ @ 2¾¢; Bessemer Blooms and Billets, $33 @ $35; do. Nail Slabs, $32 @ $33; Rail Ends, $23; Bloom Ends, $22 @ $22.50.

Steel Rails.—Both mills here are fully employed and sold for several months ahead, and prices are quoted steady at $35 @ $35.50, cash, at mill, for Heavy Sections.

Railway Track Supplies.—There is more inquiry, and an increased demand is looked for within the next few weeks. Prices remain unchanged as follows: Spikes, 2.40¢, 30 days, delivered. Splice Bars, 1.70¢ @ 1.75¢; Track Bolts, 2.75¢ with Square and 2.85¢ @ 3¢ with Hexagon Nuts.

Old Material.—There is a fair trade, and prices as a rule are steady. No. 1 Wrought Scrap is $20 ℔ net ton; Wrought Turnings, $14 @ $15; Old Car Axles, $24 @ $25; Cast Borings, $12 @ $12.50, gross. In regard to Old Wheels we can report a sale of 150 tons here at $16, gross, and 150 tons at Indianapolis at same price; Wheels are worth as much West as here, if not more. There are Car Wheel Works out there where Old Wheels are remelted, but here we have nothing of the kind.

Chicago.

Office of *The Iron Age*, 36 and 38 Clark St., Cor. Lake St., CHICAGO, March 1, 1886.

Hardware.—Jobbers report a general increase in the demand for goods. Sales for each succeeding week in the month of February aggregated a little more than the preceding one. Therefore they begin the month of March feeling that it will bring a brisk business, being the first month properly classed in spring trade. Cutting of prices has been quite noticeable on seasonable and staple articles, and in numerous cases several lines of goods have been sold at very short profits. But taking the entire line of Hardware together it is said there is more firmness and regularity than during several years previous. The general attempt on the part of manufacturers to secure better prices, and in each change making a slight advance, has done much toward sustaining the feeling that there would be no decline from present price lists. This has greatly encouraged consumers in making purchases and improved the volume of trade. No changes of importance have occurred in the past week, and the situation regarding freights, rivalry in business and other features of a similar nature heretofore mentioned remain unchanged.

Barb Wire.—So far as learned, the meeting of the manufacturers on Tuesday last accomplished nothing in the way of straightening up irregularities in sales. As a rule they report their mills only partially employed, their position being that of waiting for the demand to become more urgent. The stocks of Wire in makers' and jobbers' hands are quite ample to meet all immediate requirements, and may be in some cases responsible for the weakness in prices. Jobbers continue to quote Painted Wire at 3¼¢ and Galvanized at 4¼¢ in small lots from store. Reports come from country districts that sales are made at a fraction below these figures, and particularly so in Galvanized Wire, as some sellers do not strictly adhere to the 1¢ difference between the two grades. Some inquiry is noticeable from carload buyers, and some improvement in the demand from small trade. Including all sales, there is more business done than several weeks ago, with fair prospects that this will rapidly increase during the present month.

Nails.—The present situation between Nail manufacturers and their employees has created great irregularity in the market. Nails can be had at such a wide range on figures that no one selling price represents the actual market. The nominal quotation of $2.55 for Iron Nails and $2.75 for Steel Nails is still made by jobbers, but the price upon every hand is shaded as much as 10¢ ℔ keg, dependent upon the quantity of other goods involved in the sale. The compromise effected by the mill at Mingo, Ohio, incited others to a similar step. The Nail works at Bay View, Wis., owned by the North Chicago Rolling Mill Co., effected a

compromise on the 25th ult., on a basis of 18¢ ℔ keg when Nails are $2, and a raise of 1¢ for each advance of 25¢, and 10 % reduction on all automatic feeders. The mill was to go into operation this morning on Steel Nails. They have Steel Slabs of their own product sufficient to run them for a week or 10 days, after which they will cut Iron Nails, unless their Slab mill can be put into operation in the meantime. It is said that the North Chicago Rolling Mill Co. were not members of the Nail Makers' Association, but have been co-operating with them ever since the strike began. The Spaulding Mill, at Brilliant, Ohio, announce that they will commence work at an early day. The situation thus becomes complicated. Buyers hesitate in placing orders, while sellers are undecided whether they shall cut prices and dispose of stocks on hand. Makers are more active in looking for orders, and show signs of their willingness to furnish Nails at less figures than they have been getting in the last two months.

American Pig Iron.—The market, which has been stagnant for some time, is beginning to reap the results of inactivity. For weeks makers have been favored with a reasonable ground for claiming scarcity of Iron, but the time is at hand when this can be no longer impressed upon the consumer. Every class and grade of Iron is in ample abundance to meet all requirements, and it might be supposed from the weakness which has characterized the market recently that there is even more Iron being made than consumers demand for immediate use. When prices are advancing consumers are always anxious to place orders for future delivery for fear that they will have to pay more money if they wait longer. Upon the other hand, whenever there is the slightest indication of weakness, buyers are again afraid to place orders for future delivery, lest they may pay more than would be actually necessary later on. The latter feeling evidently controls the market to-day, and under its influence prices have materially weakened. Makers are also doing their part to further this position. Buyers having from natural consequences restricted their purchases, sellers have become agitated and are endeavoring to force sales, which greatly fortifies the view of the consumer, who is now contenting himself with buying in carload, 50 or 100 ton lots, whereas, if the situation were the same as two months ago, he would be anxious to treble or quadruple the order. The demand naturally was less during the past month than for either December or January. This, however, has been greatly enhanced by the general cessation in the demand for many lines of finished product. It is believed by all fair-minded men that the present situation of the market is only temporary; that there is sufficient new work on buildings and railroads, to say nothing of the smaller products, to absorb all the Iron that can be made and again stimulate prices to the position they obtained in January. Present quotations on Lake Superior Charcoal Irons would be made on a basis of $22, four months, for Nos. 1 and 2, standard brands. Coke Irons, All Lake Ore, $19 @ $19.50 for No. 1, and $18 @ $18.50 for No. 2 and Cinder Mixed. Ohio Scotch Irons are in fairly good request, and, if anything, scarcer than any others. Briar Hill and other Irons of the same class are quoted at $21, with Ohio Standard Blackbands as a class ranging from $19.50 to $20.50. On Southern Irons there is no material change. Present figures are only a market quotation, and do not represent bottom prices that would be made on round lots if it was possible to make sales. On Southern No. 1 Foundry we quote $19; No. 2, $18.50; No. 2½, $17.50 @ $18. Sales agents for this class of Iron contend that they have no Iron to sell, furnaces being sold up and able to obtain better prices in other markets for such as they have to offer. These statements, however, are not strictly corroborated by probable buyers, as we hear of figures having been named which were considerably below prices given.

Merchant Steel.—There has been a slight revival in the demand for Bars which has brought out considerable weakness and irregularity in prices on low grades. On several specifications for desirable orders prices were named by leading manufacturers that were somewhat below the established market, as they supposed, but were not low enough to effect sales. This surprise led to an investigation, and it was found that present quotations were being cut to a remarkable degree. Some makers report that they are full of orders and not desirous of making bids on material for early shipment. But such as have been made make the following quotations, merely a nominal asking price from store: Open-Hearth and Bessemer Spring Steel at 2¼¢; jobbing rate, 2.6¢; Flat Machinery, 2½¢; Crucible Machinery, 5¢; Crucible Cast Plow Steel, 4½¢; Patented Plow Steel, 5½¢; Standard Tool Steel, 8¢; high grades, 8½¢ @ 13¢.

Bar Iron.—The market is reported fairly active at 1.90¢ rates in small lots, and 1.80¢ @ 1.85¢ is made in carload lots. It is said that the advance is well received, and all makers are falling into line with unusual willingness and support the advance which has been made by jobbers in this city. Manufacturers, in quoting prices to jobbers, vary considerably in their ideas as to prices. We hear of quotations in this market at 1.65¢ @ 1.70¢, f.o.b., base sizes. How far these prices could be shaded with a liberal quantity of extras would depend much upon the buyer and the wants of the manufacturer. There is a feeling among consumers that prices are not likely to go lower, and they place orders more freely than for any other class of Iron.

Steel Rails.—It is rumored that there is demand for round lots to be delivered to Western roads which are in contemplation. Makers in this vicinity plead ignorance of such orders, and claim that the market is quiet and prices steady at $38 for first quality and $34.50 for seconds. Both branches of the North Chicago Rolling Mill Co. are still idle.

Old Rails.—The falling off in demand has weakened the market, and prices now quoted range from $20.50 to $21. Stocks offering are more plentiful, and buying is consequently done more deliberately. Old Steel Rails are quoted at $18.50 @ $19 for Long Sections. There appears to be more material offering than there is demand for.

Plate and Tank Iron.—Business from store has been tolerably good in the last week. Jobbers have had more inquiries for future delivery, and several large orders are in sight. Prices have weakened slightly through strong competition. We renew the following quotations from store: Tank Steel, 3¢; Flange do., 4¢; Fire-Box do., 4¼¢; Tank Iron, 2.40¢; Shell do., 2.85¢; Flange do., 4¢; Angles, 2¼¢.

Structural Iron.—Nothing of any great importance transpired in the market during the past week. Trading in small lots from store is very good for the season, and several large orders for structures outside of Chicago will be open for bids very soon. Quotations previously announced continue unchanged.

Black Sheets.—There is very little doing in a jobbing way either in Light or Heavy Sheets. The principal interest in the market seems to be centered in the placing of orders by jobbers for fall delivery. In this class of trade mills are showing considerable anxiety to obtain contracts, and prices are both weak and irregular. We continue the following quotations from store: Nos. 10 to 14, 2.60¢; No. 16, 2.80¢. Nos. 18 and 20, 2.90¢; Nos. 22 and 24, 3¢; Nos. 25 and 26, 3.10¢; No. 27, 3.20¢.

Galvanized Iron.—Strong rivalry has sprung up between the makers. It was hoped that with the close of last season the trade would settle down to a price which would be maintained by all manufacturers, but in this there is general disappointment. From present indications it appears that competition will be stronger than it was last year, and prices made that will discount those now prevailing. Makers are giving special attention to securing orders for Cornice-work Weights, for which there probably will be a good demand. Makers of the best grades of Sheets are not meeting the cuts made by the new mills, but claim that they are well supplied with orders for the present. We renew the following quotations from store: Juniata, 60 % off, and Charcoal 60 and 10 % off.

Old Wheels.—The quantity offering has reduced the open market quotations to $17, cash. We hear of sales having been made at something below this price. There are holders, however, who are unwilling to sell at this figure and are still asking $18 for immediate delivery.

Scrap Iron.—The market during the past week has been rather dull. Dealers are pretty well sold ahead on stock and are still asking $19 @ $20 for No. 1 Wrought. Mill Scrap is nominally quoted at $14 for No. 1, and $9 for No. 2. Buyers of this grade are not in active operation, and therefore there is very little demand for stock. Old Car Axles are quoted at $21.50; Horseshoes at $22.50. The following quotations are given as dealers' purchasing prices: No. 1 Wrought, $14; Machinery, $12.50; Stove Plate, $8; Steel Tires and Wagon Springs, $13; Old Plows and Plow Steel, $9.50; Wrought-Iron Turnings, $10; Cast-Iron Borings, $7.50; Malleable Scrap, $7.

Pig Lead.—The continued advance seems mysterious. The opinion prevails that abnormal interests are controlling the market by concerted action, and in some way restricting the product of Ores. Lately there has been a marked scarcity in all grades of Lead and prices forced to figures unwarrantable when the quantity consumed by manufacturers is considered. The market opened last Monday at 4.72½¢, followed by a sale of 150 tons Corroding at 4.75¢, March delivery. A continual advance was made and prices now quoted range from 4.80¢ to 4.85¢, with but little offering. Inquiry for the season is fairly good.

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts., CHATTANOOGA, March 1, 1886.

The magnitude of the general business outlook of the South is certainly very encouraging. The daily influx of Northern men of capital, the increase in the capacity of the industries that are already established, the location of new plants in almost every direction, the increase of volume of business done by the older established houses, the prosperity of the railroad lines and a large increase in both passenger and freight business, and the rise in the value of stocks in the different manufacturing enterprises, would seem to indicate that prosperity is surely coming this way. The Morrison bill has attracted some attention, but little apprehension of its passage is entertained. The banks are reporting favorable collections and a large increase of deposits, which, of course, tends to a lower rate of discounts to their customers.

Pig Iron.—As good an expression as could be used to denote the present condition of the Iron market is to say that it is quietly active There appears to be but little dickering or any unnecessary correspondence to purchase round lots, but when a customer wants a few hundred tons the market rate is asked and accepted without much ado. The sales thus far of the furnaces are ahead for several months, with small margins to guard against break-downs or the extra wants of favorite customers. There has been a gradual increase in the wants of the Southern foundries, which is likely to continue; in fact, some of them have made such additions as to warrant the assertion that their capacity will in some cases be doubled. The Dayton Coal and Iron Co. are now fairly in the market with the product of their No. 1 stack, which is making about 100 tons per day of a fine grade of Iron, mostly Nos. 1 and 2 Foundry. Sales of several round lots of their No. 2 at $17, cash, at Cincinnati, is a very good index of the market figures. Car-Wheel Iron is getting scarcer every day and is gradually stiffening up in price. The fact that all the furnaces that are on Car-Wheel Iron are under contract for their entire output for several months to come must have a tendency to make the price go still higher to those who have yet to buy.

Cast Pipe—Is still on the boom, so far as the demand is concerned; but little change in prices; arrangements are being made by the works to respond with more dispatch to their orders.

Miscellaneous.—The manufacturing interests all over the district are in a flourishing condition; the Nail factories are running over with orders, as well as the mills running on Railroad Supplies. More Light Rail—say from 12 lb to 30 lb—has been sold within the last month than during the entire past year. Branch lines from local points, also short roads running into the lumber districts, are quite popular. The prospects are also good for quite a number of important lines for which there is plenty of room.

Birmingham.

BIRMINGHAM, Ala., March 1, 1886.

Business is picking up all along the line. One very good proof of improvement is that the rolling stock of the railroads is more and more inadequate. Certain lines are considerably troubled for cars into or out of this territory, as the case may be; and this, although shipments of spring merchandise bought in the East have not fairly begun. The farmers of Alabama are not represented to be in a very enviable condition, but, whether the growth of this place is the chief cause or not, there is a better demand for Farm Machinery and Implements than there ever was before so early in the year. The Iron trade had plenty to talk about for the last week, although it does not furnish much news. A very generally credited deal of Charleston, S. C., and English capitalists for an interest in an Iron property some 10 miles from Birmingham gives promise of one new furnace or more. A much-discussed topic is the retirement of Mr. W. H. Woodward, president of the Woodward Iron Co., with a view to planting Nail works here. It is told here almost authentically that he sold his stock at $3 for $1. The company's furnace was put in operation about two years and a half ago and has paid off a considerable indebtedness incurred in its construction.

Pig Iron—Seems destined to strengthen or create trade relations for this region with the East and South and Southwest. Nothing of consequence goes to the West any more except under contracts made before the recent advance of freight rates. Still the demand is fair on the whole. Prices do not even tend one way or the other. The slight weakness shown by the market a few weeks ago seems to have been repaired since, and sales conform pretty closely to old quotations. The cutting off of Western custom has not increased stocks very sensibly yet. There is more Iron on the yards than there ought to be, though, for some of the railroads have not been able to furnish cars enough for the demand.

Finished Iron—Is quiet and promises to stay about where it is as to prices for some time yet. In several peculiarly unfortunate cases recently the mills have been shut out of comparatively new territory by impracticable freight rates.

Miscellaneous.—The same thing may be said for certain Cast-Iron specialties. For instance, inquiries have come here from Philadelphia and New York for Sash Weights, but it was found that they could not be laid down cheap enough. Some fairly satisfactory orders have been booked from other regions, though, and the foundries and shops possibly have a larger volume of work on hand now than they ever had before. Various small articles could be named that are making considerable work in the aggregate. The several small enterprises just starting are bringing in some business.

Coal and Coke.—Fuels are firm, the local consumption of Coke, anyhow, being probably larger than it ever was before.

Lumber.—The sawmill men at their meeting in Montgomery on the 24th ult. organized the Alabama Yellow Pine Lumber Association, and put up prices $1 a thousand all around. Nearly all the large mills of the State were represented. It is thought there will be another advance soon, as the demand is unprecedented.

Cincinnati.

MARCH 1, 1886.

Pig Iron.—The market during the past week has been confined mostly to small lots to consumers for immediate use at quotations. Foundrymen in the West and Northwest are encouraged that business will speedily revive on the approach of settled and warmer weather, from inquiries already begun for castings and machinery of every grade. The strikes in the Pennsylvania Coke region being now adjusted lifts a cloud from the Western Iron business, to make the skies more clear over all branches of trade. The *Bulletin* of the Western Pig Iron Association, February 22, shows an increase of stocks of Coke Iron in January of some 20,000 tons, which is less than what was expected comparing with January 7, 1885, which showed an increase of nearly 50,000 tons. It is to be remarked that these January surpluses rapidly disappear in March and April under the increased demand for actual consumption. Quotations from sales:

Charcoal Foundry.		
Hanging Rock, Best, No. 1, 4 mos.	$21.00 @	.....
Hanging Rock, Good, No. 1, 4 mos.	20.00 @	20.50
Hanging Rock, Good, No. 2, 4 mos.	19.00 @	19.50
Southern No. 1, 4 mos.	18.00 @	18.50
Southern No. 2, 4 mos.	17.00 @	17.50
Coke Foundry.		
Southern No. 1, 4 mos.	18.00 @	19.00
Southern No. 2, 4 mos.	17.25 @	17.75
Ohio and West Pennsylvania, No. 1, 4 mos	18.00 @	19.25
Ohio and West Pennsylvania, No. 2, 4 mos.	17.50 @	18.00
Ohio and West Pennsylvania, Bessemer No. 1, 4 mos.	20.25 @	.....
Ohio and West Pennsylvania, Bessemer No. 2, 4 mos.	19.50 @	.....
Silver-Gray Softeners.		
Ohio, No. 1, 4 mos.	18.00 @	19.00
Ohio, No. 2, 4 mos.	17.00 @	18.00
Ohio, No. 3, 4 mos.	16.00 @	17.00
Other makes, 4 mos.	17.50 @	18.00
Car-Wheel.		
Hanging Rock Cold-Blast Charcoal, 4 mos.	25.00 @	26.00
Virginia Cold-Blast Charcoal, 4 mos.	26.50 @	.....
Georgia Cold-Blast Charcoal, 4 mos.	25.00 @	.....
Southern Warm-Blast	18.00 @	20.00
Southern Standard	23.00 @	25.00
Hanging Rock Warm-Blast, 4 mos.	19.20 @	.....
Forge.		
Various makes and grades, 4 mos.	15.00 @	18.00
Scrap.		
Rails	20.50 @	22.00
Wheels	17.00 @	18.00
Wrought, range of grades, ℔ 100 lb.	.50 @	.80
Cast, range of grades, ℔ 100 lb.	.30 @	.70

Above quotations on Pig Iron are f.o.b. here, or less the freight to Cincinnati where orders are filled direct from furnaces; 50¢ ℔ ton discount from time quotations.

Louisville.

W. B. BELKNAP & Co., Louisville, write as follows, under date of March 1, 1886: A week of good weather has had an agreeably reviving influence upon trade. Sunshine has brought fresh courage and hope, and all sorts of active operations have begun. The demand for Wire for Nails, Wheelbarrows and various outdoor implements and supplies has been extremely good.

Bar Iron—Also has felt the beneficent influence, and is moving in better quantities. Prices seem to share a reaction, and almost all changes are toward higher figures. The progress is gradual, and all the more certain for being so. In a number of articles the price has not moved at all, but where they were abnormally low, and so recognized, advance has been made and established. The mills are cleaning up their old cheap contracts, and are asking full prices for the new.

Hoops and Bands.—These have not felt the advance in any measure to speak of. There does not seem to be enough work to go around the Hoop mills, and consequently there is sharp competition for the trade, and small lots are placed as advantageously as large ones.

Sheet.—Heavy Sheet, as we noted before, is bringing fair and full prices. The lighter gauges are still extremely low, though some makers claim to see better things in the immediate future and are refusing to enter orders for delivery beyond March.

Steel.—A new classification of Cast Steel has been made. We have received a list from the Crescent Steel Works which indicates some decided changes in the extras. These would appear to be fairer to the manufacturers than the old classifications.

Nails.—The independent action of the Laughlin and Chicago mills in breaking loose from the association and starting up on their own basis it was thought would certainly end the long-continued Nail strike, and there was considerable disappointment in the trade when the conference ended on the 25th ult. without an amicable understanding having been arrived at between manufacturers and men. Still it looks as though these repeated efforts to adjust the matter must finally be crowned with success. Nails are in fair demand, and although stocks are known to be light there is no more rush for them than is usual at this season, if, indeed, as much. The Western and Southern mills have helped to maintain the supply. Prices rule about steady. The Eastern mills, even at the advanced freight rates, come in here too easily to permit anything like a local boom.

The good weather has also stimulated the Plow business, and the large factories here are running full and shipping freely of their product. Altogether the spring trade seems to be upon us in comfortable volume, and we shall probably have our hands full for some weeks to come. There is a rumor current that some Eastern parties are to buy the Kentucky Rolling Mill at this point, which has stood idle for a number of years, and put it into operation.

GEORGE H. HULL & Co., of Louisville, report to us as follows, under date of March 1: The sales of Pig Iron continue light. Several inquiries have come from buyers, but no large transactions have been effected, as most of the Southern furnaces decline new orders, and are only shipping on sales already booked. The only lots of Iron for sale are some odd grades for which furnaces do not book orders ahead, and some speculative lots which buyers are willing to sell at market prices. Prices remain firm and without change. We quote for cash as below:

PIG IRON.		
Southern Coke, No. 1 Foundry	$18.00 @	$18.50
" No. 2 "	17.00 @	17.50
" No. 2½ "	16.50 @	17.00
Hanging Rock Coke, No. 1 Foundry	18.00 @	18.50
Hanging Rock Charcoal, No. 1 Foundry	20.00 @	21.00
Southern Charcoal, No. 1 Foundry	18.00 @	19.00
Silver Gray, different grades	16.50 @	17.50
Southern Coke, No. 1 Mill, Neutral	16.00 @	16.50
" " No. 2 " "	15.00 @	15.50
" " No. 1 " Cold Short	15.50 @	16.00
" Charcoal, No. 1 Mill	17.50 @	18.00
White and Mottled, different grades	13.00 @	14.50
Southern Car-Wheel, standard brands	25.00 @	26.00
Southern Car-Wheel, other brands	21.00 @	22.00
Hanging Rock, Cold-Blast	27.00 @	28.00
" " Warm-Blast	21.00 @	22.00

St. Louis.

ROGERS, BROWN & Co., St. Louis, W. H. SHIELDS, manager, report, under date of March 1, 1886: The market has been quiet the past week, with prices firm. We have little or no change to make in our quotations:

CHARCOAL FOUNDRY.		
Missouri	$17.00 @	$19.00
Southern	18.00 @	20.00
COAL AND COKE FOUNDRY.		
Southern No. 1	18.75 @	19.00
Southern No. 2	17.75 @	18.00
American Scotch	18.00 @	21.00
MILL IRON.		
Southern	15.75 @	16.75
CAR-WHEEL AND MALLEABLE IRONS.		
Southern	20.00 @	25.00
Lake Superior	22.00 @	24.00
SCRAP, ETC.		
Old Wheels	16.00 @	17.00
Old Rails	21.00 @	22.00
Connellsville Coke (East St. Louis)	... @	5.40

Detroit.

Charles Himrod & Co., dealers in Pig Iron, Detroit, Mich., report, under date of March 1, as follows: We are compelled to report the continued weakness in the market; almost nothing is being done here, and nearly an entire absence of quotations, and one can hardly say from all the evidences and the present outlook that better prices can be expected in anything like the near future; but, notwithstanding the stagnation at present in the buying line, we are assured that a greater consumption of Iron is being made now than at any time during the past year, and if this is only continued long enough the level of prices is sure to be raised. Other industries report a nearly similar condition; in this case, the exception, the "misery loving company" rule is pretty plain. To-day the market is fairly quotable, on four months' time, as follows:

Lake Superior Charcoal, all numbers	$21.00 @	$22.00
Lake Superior Coke, All Ore	20.50 @	21.00
Lake Superior Coke, Cinder Mixed	19.00 @	20.00
Standard Ohio Blackband	20.50 @	21.00
Southern No. 2	18.00 @	19.00
Southern Silvery, Open	17.50 @	18.50
Southern Silvery, Close	17.00 @	18.00
Jackson County, Ohio Silvery	19.50 @	20.00
No. 1 Southern Mill	16.50 @	17.50
American Old Iron Rails	22.00 @	24.00
Old Wheels	17.00 @	19.00

Coal Market.

The Anthracite Coal market, no longer supported by the schemes of rival syndicates—which are pronounced "all nonsense"—is weak and demoralized. March brings no improvement. The tendency, rather, is to lower prices, as indicated by the new circular of the Pennsylvania Coal Co., dated March 1, as follows:

Grate	$2.90	Chestnut	$3.35
Egg	2.90	Pea	1.85
Stove	3.35	Buckwheat	1.60

Twenty-five cents ℔ ton additional for delivery at New York "alongside."

The above is claimed to be not actually a reduction, but a recognition of the "cuts" which had become general, equivalent to about 10¢ ℔ ton. The Delaware and Hudson and other companies in the Lackawanna trade at once fell into line, not intending to be undersold. For Lehigh Coal $3.50 @ $3.60 is wanted for Stove, but sales are said to be taking place on a very limited scale much below these figures. The situation is explained by an influential observer in Coal circles by directing attention to the fact that the excessive supplies which now depress the market are the result of unrestricted mining in comparison with the year 1885, when it was usual to work alternate weeks, the increased production being about 1,000,000 tons.

The Bituminous trade has been injured by a false report to the effect that a combination had agreed to advance prices 30¢ ℔ ton March 1st. Miners have from this statement been encouraged to stand out for an advance of 10¢ ℔ ton, but we learn authoritatively that operators in the Cumberland and Clearfield regions have been instructed to grant no advance—that the market would not bear it. It is not known that any disturbance will ensue. Quotations are $3.15 @ $3.25. The pool has decided to fix no prices for the current year.

The inter-State convention of coal miners at Columbus, Ohio, last week adopted a resolution constituting a board of arbitation, consisting of two miners and two operators from each of the five States represented in the scale, to which will be referred all questions of a national character among miners and operators for adjustment, and recommending that each State select a similar board.

The Old Dominion Iron and Nail Works Co., at Richmond, Va., are rapidly completing the order for bar iron for 500 railroad cars now being made at the Roanoke Machine Works. This perhaps is the largest single order for bar iron ever taken by a Southern rolling mill. The large nail factory of this company is steadily at work running 100 nail machines.

Trade Report.

General Hardware.

A fair activity is generally reported, and there is an undoubted improvement in business, although it has not as yet come up to the sanguine expectations that were formed some time ago. There is, however, no doubt that business is in a more satisfactory condition than it has been for some time, and with a general strengthening of prices, as reflected in our quotations, and the announcements made from week to week in regard to special lines, there is reason to anticipate a satisfactory season's trade. The special features of the market are alluded to below.

NAILS.

The market has been steady during the week under review, and, while no special activity has prevailed, it is noted that inquiries for large lots are becoming more numerous. The majority of sellers are firm at nominally $2.40 for carload lots from dock, and $2.45 to $2.50 from store, which we quote.

We discuss editorially the effect of the building of Steel plants toward centralization of manufacture of Nails.

BARB WIRE.

The market is fairly active, considering the weather during the past week, and is steady at unchanged prices, which have been fixed at our quotations for March. We quote 4.75 cents for carload lots of Four-Point Barb Wire, Galvanized; 4⅞ cents for 3-ton lots and 5 cents for 1-ton lots.

LOCKS.

Sargent & Co., New York and New Haven, issue a preliminary catalogue and price list of Door Locks, Knobs, Escutcheons, &c., which illustrates the line of these goods on which they are prepared to receive the orders of the trade. It is an attractively printed and exceptionally well-arranged pamphlet of 60 pages, in which leading styles of these goods are represented by excellent illustrations and with concise and satisfactory descriptions and list prices. The list, which is the same as that of the associated manufacturers, is subject to a discount of 40 and 10 per cent., with an additional 10 per cent. extra discount for prompt cash. An additional discount of 5 per cent. will be allowed to parties whose purchases of Locks, Knobs and Escutcheons shall amount to $500 net within the season ending June 30, 1886. The trade will regard with much interest the announcement that these goods are on the market.

MISCELLANEOUS PRICES.

Hammer & Co., Branford, Conn., have made a change in the discount on their old pattern Malleable Oilers, which is now 45 per cent. in gross lots. Their Improved Oilers are quoted at discount 10 to 10 and 10 per cent., as before. The list for both styles is the same: No. 1, $3.60; No. 2, $4; No. 3, $4.40.

A meeting of the manufacturers of Horse Nails, at which most of the leading concerns were represented, was held in this city on the 24th ult., and the schedule of prices now in existence was confirmed for the remainder of the year.

Silver-plated Flat Ware is quoted at somewhat higher figures, the market being characterized by increased strength, and some manufacturers have advanced their quotations. Others are, however, quoting former figures.

The market for Cast Iron Butts continues strong, and the extreme price has been advanced from 5 to 10 per cent. within a short time. A good many jobbers are, however, still selling them at low figures, and in many cases at about the prices which they would now be obliged to pay for the goods. We are, in fact, in receipt of advices of purchases by retailers of the Butts at lower prices than can now be obtained by large buyers.

At a meeting of the manufacturers of Wrought Iron Butts held in this city to-day the following advanced prices were agreed upon, the discounts given being subject to an additional 2 per cent. for cash in 10 days:

Wrought Narrow Butts, &c.....discount 65 %
Wrought Loose Joint Butts.....discount 65&5 %

W. H. Mooney & Co., Ausable Chasm, N. Y., issue a circular advising the trade of the annual meeting of the Horse Nail Makers' Price Association, and the renewal of the combination of 1885 for the present year, and quoting their C. B. K Horse Nails at discount 25 per cent., and their A. C. Horse Nails at discount 25 and 5 per cent.

Wrought Brass Butts are in substantially the same condition as when we last referred to them, and discount 75 and 10 per cent. may be named as the current price.

Another advance of 5 cents has been made in the price of Shot, which is now quoted $1.45, instead of $1.40.

Manila Rope is regarded as quite weak, owing to the low price of Hemp, and reduced quotations are looked for.

The trade will observe on pages 22 and 23 the announcement of the Manhattan Hardware Co., Reading, Pa., giving quotations on their goods. They also intimate that on April 1 present prices will be advanced from 10 to 15 per cent., an announcement which they allude to as made some 20 days in advance, in accordance with their usual custom, and in justice to their distant trade.

At a meeting of the manufacturers of Bright Wire Goods, which has recently been held, the discount of 75 and 10 per cent. was adopted as the regular quotation.

The Ray Hubbell Mfg. Co., Northville, N. Y., issue a circular of their Corners and Bindings for Oil Cloth, in which list prices are given and the following discounts, with an additional 2 per cent. for cash in 10 days:

On orders for one-half gross (6 dozen sets) with Corners ..... 5 per cent off
On orders for one full gross (12 dozen sets) with Corners ..... 10 per cent off

The circular also calls attention to the special features of these goods and the advantages connected with their use.

The New England Butt Co., Providence, R. I., issue a circular, February 26, announcing the discount of 66⅔ per cent. on Cast Butts, with an extra 10 per cent. for prompt cash.

The Madden & Cockayne File Co., Middletown, N. Y., issue, February 25, an announcement that all quotations made by them previous to that date are withdrawn, and that new discounts, which they trust will be found satisfactory, will be made on application.

The Star Lock Works, Philadelphia, for whom Sise, Gibson & Co. are agents, issue a sheet giving full-size cuts of the following Spring Padlocks, the list prices of which are subject to a discount of 40 per cent.:

No. 385, Brass, per dozen	$3.50
No. 386, Brass, per dozen	4.50
No. 387, Brass, per dozen	5.50
No. 388, Brass, per dozen	7.00

Announcements are being made of an advance in White Lead, which is now quoted 7 cents per pound, with corresponding prices for other lines.

William Blair & Co., Chicago, Ill., in their price current, February 23, refer as follows to the condition of trade and the special features of the market in the different lines below referred to:

The business outlook is very encouraging. Wide-awake merchants in the country are making early purchases in anticipation of advance in prices in the near future. There has been considerable advance in some lines of goods, but the principal feature of the market is a general stiffening up of prices by the manufacturers on nearly all kinds of goods. *Screws.*—We print on page 7 a new Screw list adopted by all the makers on the 15th inst. The discount from Flat Head Steel and Iron is 75 and 10. *Files.*—We print on page 11 the new File list adopted by the manufacturers November 20, 1885, and which is now in general use. *Copper.*—Sheathing and Bottoms have advanced about 3 cents per pound. *Nails.*—Stocks are light, the production is limited and the demand is heavy and increasing. Steel Nails at present are about 20 cents per keg higher than Iron. *Barbed Wire*—Is being sold by jobbers at present below manufacturers' prices. As soon as old stocks are reduced there must be a material advance, as there is no margin for the manufacturers at present between the price of Plain and Barbed Wire *Tin Plates.*—There has been a decline of 25 cents per box on the small sizes and 50 cents on the large, both of Tin and Terne Plates, since our last circular. This is owing in part to the great variety of inferior brands offered by brokers and others. The "New Process" Plates have a very smooth surface and consequently require a lighter coating of Tin, which accounts for their cheapness. We carry a very heavy stock of the old and well-known brands named below, which we are selling at same price at which some of the inferior brands are offered. We do not carry in stock Tin Plates put up with tissue paper between the Sheets, but any one desiring a quantity can have any of the brands ordered from the makers in that way, at a trifling additional cost.

ITEMS.

Morley Bros., East Saginaw, Mich., issue their spring bulletin, a pamphlet of nearly 100 pages, gotten up in convenient and attractive form, in which they illustrate some of their seasonable specialties. The line represented includes Steel and Wood Goods, Rakes, Pruning Shears, Sheep Shears, Post-Hole Diggers, Wheelbarrows, Refrigerators, Oil and Vapor Stoves, Bird Cages, &c. In their introductory circular to the trade they allude to the complete line of Hardware they carry, and call special attention to their shipping facilities, making the point that from their desirable location near the center of their State they can easily and quickly reach by rail or water, or both, points in the upper or lower Peninsula, and that, having direct communication with Milwaukee and Chicago, they have facilities for reaching trade in Wisconsin and the West and Northwest generally at low rates of freight. The fact that they are manufacturers of the Blue Line Lumbering Tools is also alluded to, but the goods are not represented in the catalogue.

Simmons Hardware Co., St. Louis, Mo., issue a price list of their Perfection Gasoline Stoves, and also an illustrated circular of Children's Carriages, Boys' Wagons, Velocipedes, Bycicles, Tricycles, Wheelbarrows, Water Coolers, Freezers and Refrigerators, which is gotten up in attractive style.

S. H. Larned, the Worcester Tack and Staple Co., Worcester, Mass., issues a convenient price list and illustrated catalogue of Double Pointed Steel Tacks, Steel Wire Tacks and Nails and Round or Flat Wire Staples.

The Triumph Wringer Co., Keene, N. H., announce that they have added an additional improvement to their Lever Wringer, the Triumph, by means of which three different pressures can be obtained, thus securing, it is claimed, sufficient pressure in all cases. They also call attention to the fact that they use water-proof black enameled handles on their machines, which they refer to as adding to their appearance, being more durable than any other finish, and leaving the handle smooth to the hand.

The Champion Roller Skate and Wagon Co., Richmond, Ind., manufacturers of Rowlett's Champion Lawn Mower, in their circular describing it, lay special emphasis on the following points: That it has an 8-inch driving-wheel, giving greater power and speed on the reel and making it a very light running machine; that, having a large pinion gear-wheel on the reel shaft, there is a greater leverage on the knives; that it has an improved working or backing ratchet, provided with steel pawl pins and ratchet collars, and has no springs of any description; that it has an improved hood washer on the end of driving-wheel spindle, to prevent the grass from catching and clogging on the spindle.

The Joseph Dixon Crucible Co., Jersey City, N. J., who are widely known as the manufacturers of the Dixon Stove Polish, are also leading makers of Lead Pencils, of which, they advise us, for 16 cents in stamps they will send samples worth double the money.

Manufacturers of Freezers report the prospects for trade in this line during the coming season as being excellent, the orders thus far received being ahead of last year. The fact that the natural element, ice, is to be abundant is referred to as favorable to a prosperous trade.

Paine, Diehl & Co., Philadelphia, issue February 15 a convenient pamphlet describing some of their specialties, including Bryant's Egg Beater, Unbreakable House and Machinists' Lamps, Bauer's Patent Wrench and Tongs, and Pipe and Bolt Vise, Coyle's & Macqueen's Universal Tapping Union, Royle's Hose Connection, Threaded Nipple and many other specialties.

The prominence which Wire Nails are assuming in the market is indicated by the fact that some of the leading jobbing houses quote them along with Cut Nails, advising the trade that they carry a full line in stock.

E. B Preston & Co., 151 Lake street, Chicago, are sending out a catalogue of Belting and Rubber Goods, in which they call attention to their special lines.

The New York Supply Co., 50 and 52 John street, announce March 1 that they have purchased the stock, fixtures and business heretofore carried on by W. C. Duyckinck, and will continue the business at the old stand, keeping a full line of Railway, Machinists', Engineers', Steamship, Brewers', Mill, Miners', Plumbers' and Gas and Steam Fitters' Supplies. A circular is also issued by Mr. Duyckinck, announcing the change above referred to and commending to the trade his successors, and mentioning that he will retain deskroom at the above store, in order to close up all accounts pertaining to his former business.

By their announcement on page 45 it will be seen that the De Witt Wire Cloth Co., 87 Chambers street, New York, call attention especially to their Wire Doors with Knobs and Hinges, ready to put up, and illustrate also a Spring Hinge, to the excellence of which they allude.

Hess, Snyder & Co., Massillon, Ohio, in their illustrated catalogue and price list describe the different styles of Novelty Patent Wood and Iron Combined Lift and Force Pumps which they are manufacturing. The special features of these Pumps are clearly described and their advantages mentioned. Alluding to the fact that they have been unable to supply all orders for the Novelty Pumps, they state that they are increasing their facilities for their manufacture, and hope to be able to hereafter execute orders promptly.

W. H. Jacobus & Co., 90 Chambers street, New York, in their announcement on page 45 refer to the agencies which they have secured, including the Ireland Mfg. Co., successors to the Morris Sash Lock Mfg. Co., Penn Lock Works, Dibble Mfg. Co., and others.

The Gilbert & Bennett Mfg. Co., 42 Cliff street, New York, issue an illustrated circular relating especially to Galvanized Twist Steel Wire, Poultry Netting, Web Wire Fence, Galvanized Twist Wire Cloth and Galvanized Steel Wire Cloth, which will be of interest to the trade.

Lyman H. Drake, Burlington, Iowa, issues a spring price current of seasonable goods, covering Steel Goods, Rakes, Hoes, Scythes, Shovels and Spades, Wheelbarrows, Clevices, &c. It also represents as something new the Fountain City Rope Reel, of which, as of most of the lines covered by the pamphlet, an illustration is given.

The Elyria Shear Co, Elyria, Ohio, write us that they have appointed as their general sale agents T. P. Burke & Co., 100 Chambers street, New York, who will be at all times prepared to name their most favorable terms. It is also intimated that in a short time they will carry with them a full stock of their Shears, to supply the immediate wants of their customers in this city.

The Pennsylvania Wire Works, Edward Darby & Sons, Philadelphia, issue their catalogue No. 15 for the present year, which represents their extensive line of Brass, Copper and Iron Wire Cloth, Riddles, Screens, Wire Fence, Iron Railing, &c., with a number of specialties. During the past year they have largely increased their manufacturing facilities, in connection with which they refer to their improved machinery as enabling them to offer inducements to their customers.

Farley & Hofman, Rochester, N. Y., manufacturers of Show Cases, whose announcement appears on page 6, have removed their Albany store to Boston, Mass., whither they expect soon to move their factory.

A correspondent not far from Chicago refers as follows to the condition of trade, alluding to the business activity, which, in his experience, is most evident:

There is no change in the volume of business. Where the volume arrives or comes in is really hard to discover. The assembling together of bees around a sugar barrel gives a faint conception of the number of traveling men that call each day. Six to ten is the average. White Lead, Mixed Paints and Fishing Tackle men have predominated for the past week, with a Whip or Alabastine man thrown in occasionally.

In a letter from which we make the following extract a Hardwareman alludes to his experience, with which some of our other readers will perhaps sympathize, in making improvements in his store:

Should any of your readers want a picnic for a change during this quiet time, let him have three carpenters for four days making alterations in the arrangements of his Hardware. Be sure to engage men who prefer a warm and comfortable inside job to outside work, or who have no other job in view. Either of these considerations is enough to make them desire to inflict themselves on you as long as, if not a little longer than, possible. The interest they display in fitting a joint and the suggestions they offer from a large experience of how much better some other way than the one you order would be for this or that is delightfully enervating During this work, and, in fact, for the several days after their departure, while cleaning up and rearranging stock, one's environments are not congenial. The questions asked and remarks made about these improvements by your daily heat-absorbing visitors are tiresome in the extreme. The anticipated pleasure of trying some of *The Iron Age* suggestions in arranging stores is gone before you are through, and you wish you had never started to make the alterations.

E. H. Huenefeld, jobber of Refrigerators, Bird Cages, Water Coolers, &c., and importer and dealer in Tin Plate, Tinners' Tools, &c., Cincinnati, Ohio, has removed to the new and more commodious store, 25 and 27 East Ninth street. His catalogue, January, 1886, illustrates his line of Bird Cages.

The Portsmouth Wrench Co. issue a catalogue for the coming season, in which their Always Ready Wrench is prominently represented, descriptions being also given of Adams' Countersink, Stickney's Lightning Brad Awl, Perkins' Door Check and a number of other specialties.

The Manhattan Stamping Works, 509–515 First avenue, New York, have removed to their new factories, 103–111 North Third street, Williamsburg, Brooklyn, E. D.

The W. H. Sweeney Mfg. Co., 240 Water street, New York, issue a catalogue and price list of their Tin, Brass and Copper Goods. The catalogue is a neatly printed pamphlet of some 100 pages, each page of which is illustrated with two or more cuts. The line of goods manufactured by this company includes Tea and Coffee Pots, Tea Kettles, Soup Tureens, Coal Hods, Water and Dinner Pails, Wash Boilers, Trays, Water Coolers, Pans, Pie Plates, together with a long list of miscellaneous Cooking and Household Utensils. In presenting this catalogue to the trade the company call attention to the fact that they have of late added extensively to their list of manufactures, especially in the line of Copper Ware and Heavy Polished Tinware. They refer to their increased force of workmen and improved machinery as enabling them to produce more perfectly finished goods and more promptly than heretofore.

Cooper & McKee, manufacturers of Refrigerators and Woodenware, 119 Guinnett street, Brooklyn, E. D., whose announcement may be found in our advertising columns, page 50, issue their catalogue for the coming season, in which they represent an enlarged line of Refrigerators and Ice Chests for families, hotels, grocers, butchers, &c., together with Meat Safes, Blacking Cases, Enameled and Porcelain Water Tanks, Water Coolers, &c. Their line of Refrigerators is made on the dry-air principle, and special attention is called to the fact that they are all double-boxed, and the inside box covered with hair felt or felt paper, which is referred to as equal, if not superior, to charcoal filling. Their line of Woodenware embraces Skirt Boards, Bosom, Lap, Pastry and Meat Boards, Clothes Horses, Kitchen Tables, Step-ladders, Butlers' Trays, Library Steps, Wash Benches, &c.

RETAIL PRICES 20 YEARS AGO.

The Saginaw *Courier* of recent date gives the substance of a conversation with George W. Morley, of Morley Bros., East Saginaw, Mich., regarding the Hardware trade, in which he alluded to the fact that few persons are aware of the depreciation in the price of goods during the past score of years, and the corresponding increase in the purchasing power of a dollar. Referring to a cash book of sales made by Morley & Schmitz in the winter of 1864–1865, Mr. Morley furnished the following interesting figures, which, taken in connection with present prices, give a comparison of the retail prices of Hardware as sold by the firm of which he was a member 20 years ago, and those at which they are sold by Morley Bros. at the present time:

	1864–65.	1885–86.
⅜ Chain, per pound	.22½	$0.06
Common Iron, per pound	.09½ @ .10	.02
¼-inch W't Spike, per pound	.12	.04
Horse Nails, per pound	.50	.18
10-Penny Nails, 100 lb.	$9.25	2.85
Horse Shoes, per pound	.11½	.04
Stove Pipe, per pound	.20	.05
Elbows, each	.55	.20
Trace Chains, per pair	1.75	.65
Manila Rope, per pound	.32	.15
Putty, per pound	.10	.04
8-Inch Mill Files, doz	6.00	1.45
8x10 Inch Glass, box	6.50	2.40
9x12 Inch Glass, box	7.00	2.40
2-Inch Square Steel, per pound	.22	.05
Chopping Axe	2.25	.85
Common White Lead, cwt	10.60	6.50
Heavy T 12 Inch Hinges, pair	1.00	.30
No. 24 Sheet Iron, per pound	.12½	.03½
No. 8 Cook Stoves, without furniture	37.60	12.00
1 doz 12-Inch Butcher Files	17.00	2.50
No. 11 1¼ Screws, gross	.86	.27
No. 10 Screws, gross	.80	.25
Common Railroad Shovel, pr dz.	24.00	7.50
Kerosene Lantern	2.50	1.00
Com. Wardrobe Hooks, per doz.	.50	.15
Axle Iron, 1¼ Inch, per pound	.17	.06
Monkey Wrench, 12 Inch	2.75	.70
Taper File, 4½ Inch	.30	.10
10-Quart Tin Pail	2.50	.85
Spring Steel, per pound	.20	.05
Sheet Lead	.32	.08
Cross Cut Saw	11.00	2.25
Sheet Zinc, per pound	.28	.10
Wheelbarrow	3.75	1.50

As further bearing on this matter Mr. Morley stated that in 1864–65 they paid tinners $1.25 to $1.75 a day, common labor $1 25, and that salaries of clerks ranged from $300 to $600 per year.

THE RUSSELL & ERWIN MFG. CO.,

New Britain, Conn., and New York, issue their revised price lists and discounts of Hardware No. 8, bearing date February 15. The list prices on their line of Locks, Latches, Knobs, Padlocks, &c., are given. Their discounts, announcing, it will be observed, the advanced prices on Cast Iron Shelf Hardware, to which we have already referred, and revising also the quotations on Hardware generally, are given below as far as our space permits. The remainder will be given in our next issue. These prices will be of interest to our readers as representing the present condition of the market. In addition to the discounts named, an extra 2 per cent. is allowed on all goods to page 504¼ if paid within 30 days from date of invoice:

Page.	Dis. per cent
1 to 142¼, Locks, &c	net, 50
142, Strikes	net, 50
146¼, 147, Steel Keys	net, 50
152, 153, Brass and Iron Keys	net, 50
153, Plating and Bronzing Lock Fronts, &c.	net, 50
154 to 161, Door Knobs	net, 50
162, Door Knobs, Brass and Plated	net, 50
Swivel Spindles	net, 50
163, Closet Knobs	net, 50
164, 165, Cupboard Knobs	net, 50
166, Refrigerator Knobs	net, 50
167, Cupboard Knobs and Nuts	net, 50
168, Mortise Bolt or Half Knobs	net, 50
169, Canada Bolt and Sash Knobs	net, 50
Thumb Knobs and Roses	net, 50
T Handles and Roses	net, 50
170, 171, Cranks, Handles and Knobs	net, 50
172, Shutter Knobs	65
172½, 173, Shutter Knobs	45
173, Drawer Knobs	55
174 to 182, Escutcheons	net, 50
183 to 185, Bell Pulls	net, 50
186, Bell Levers	net, 50
Bell Slides and Pulls	net, 50
187, Flush Pulls	net, 50
Flush Pulls, Japanned	net, 50
188, Flush Cups and T Handles	net, 50
Brass and Iron Stops	net, 50
Brass Astragal	net, 50
Iron Bolts and Guide Plates	net, 50
189, Sliding Door Rail, Cast Brass	55
Sliding Door Rail, Iron	55
Sliding Door Rail, Half Round	55
Barn Door Rails	55
190, Sheaves	55
191, Sheaves	55
192, Sheaves	60&10
193, Sheaves	55
196 to 275, Locks, Real Bronze Fronts	net, 50
277, Mortise Door Bolts	net, 50
279, Mortise Door Bolts, Self-Locking	net, 50
280, 281, Mortise Latches, Real Bronze Fronts,	net, 50
282 to 285, Real Bronze Store Door Handles and Latches	33⅓&10
284½ to 285, Real Bronze Door Pulls	33⅓&10
286, 287, Mortise Locks for Store Doors	net, 50
288 to 291, Store Door Handles and Locks	33⅓&10
292, Bar Handles	33⅓&10
292½ to 293¾, Store Door Handles and Locks,	33⅓&10
294 to 304¼, Real Bronze Door Knobs	net, 50
305, Lava Door Knobs and Escutcheons	net, 50
306–306¼, Real Bronze Thumb Knobs and Roses,	net, 50
Real Bronze Mortise Bolt Knobs	net, 50
Real Bronze and Brass T Handles	net, 50
307, Real Bronze T Handles	net, 50
308, 308¼, Real Bronze Lever Handles	net, 50
309, Real Bronze Lever Handles	net, 50
310, Real Bronze Crank Handles and Knobs	net, 50
310⅛, Real Bronze Cups and T Handles	net, 50
310¼ to 321, Real Bronze Escutcheons	net, 50
322 to 329, Real Bronze Bell Pulls	net, 50
330–330¼, Real Bronze Bell Levers	net, 50
330–330¼, Real Bronze Mouth Pieces	net, 50
330¼–331, Sliding Door Pulls	net, 50
332 to 334¼, Finger Plates	net, 50
335, Name Plates	net, 50
Letters	net, 50
Numbers	net, 50
336¼, Butts, Florentine Bronze, No. 9002	75
Butts, Rohida Bronze, No. 9002	70
337, Butts, Florentine Bronze, No. 9001	75
Butts, Rohida Bronze, No. 9001	70
339, Butts, Florentine Bronze, No. 8014	65&10
Butts, Florentine Bronze, No. 8014½	50
Butts, Rohida Bronze, No. 9014	45
340–341, Butts, Real Bronze, Nos. 9 and 10	40
342–343, Butts, Real Bronze, Nos. 11 and 11¼	40
344, Butts, Real Bronze, No. 14	33⅓
345, Butts, Real Bronze, No. 18	50
346–346¼, Butts, Real Bronze, Nos. 52 and 53	55
347, Butts, Real Bronze, No. 54	55
348, Butts, Real Bronze, No. 50	55
349, Hinges, Real Bronze, No. 12	65
350, Hinges, Real Bronze, No. 20	50
351, Hinges, Brass and Hd. Pla., Nos. 1 and 2	40
352¼, Butts, Florentine Bronze, No. 8004	75
Butts, Rohida Bronze, No. 9004	70
353, Butts, Florentine Bronze, No. 8003	75
Butts, Rohida Bronze, No. 9003	70
354¼, Butts, Kahala Bronze, No. 8012	75&10
Butts, Bronzed, No. 7013	60&10
Butts, Bronzed, No. 7013¾	50
355, Butts, Florentine Bronze, No. 8015	65&10
Butts, Florentine Bronze, No. 8015¼, 8015¾	50
Butts, Rohida Bronze, No. 9015	45
356, Butts, Rohida Bronze, No. 9017	45
356¼, Butts, Bronzed, No. 7014	60&10
357, Butts, Real Bronze, No. 15	45
358¼, Butts, Real Bronze, No. 62	55
358¾, Butts, Real Bronze, No. 64	50
358½, Butts, Real Bronze, No. 60	55
359, Butts, Real Bronze, No. 17	40
360, Shutter Butts, Florentine Bronze, all Nos.	60&5
Shutter Butts, Rohida Bronze, all Nos	50
Back Flaps, Florentine Bronze, all Nos.	60&5
Back Flaps, Rohida Bronze, all Nos	50
360¼, Wrought Brass Hinges	75&10
Wrought Brass Shutter Hinges	75&10

360½, Wrought Brass Parliament Butts......75&10
Make list....... 1¾ x 2 — 1¾ x 2½ — 1¾ x 2¾
$3.75 — 4.00 — 5.00
360¼, Wrought Brass Broad Butts, Bronzed...30&5
Wrought Brass Inside Blind Butts, Bronzed......30&5
360¾, Wrought Brass Loose Pin Butts, Bronzed......30&5
361-362, Real Bronze Shutter Butts and Back Flaps, all Nos......50
Add No. 7, 2 x 1¾ inches, $8.35 per dozen.
No. 6, 1¼ x 2¼ inches, 6.00 per dozen.
No. 56, 1¼ x 2¼ inches, 6.00 per dozen.
No. 57, 2 x 1¾ inches, 9.50 per dozen.
No. 256, 1¼ x 2¼ inches, 6.00 per dozen.
No. 257, 2 x 1¾ inches, 8.35 per dozen.
No. 257, 2 x 2 inches, 9.00 per dozen.
363, Real Bronze Shutter Butts and Back Flaps, all Nos......50
Bronzed Shutter Hinges......50
364, Real Bronze Pocket Hinges......33⅓
Real Bronze Parliament Butts, No. 30......33⅓
Make list..... 3 — 3½ — 4 — 4½
$1.25 — 1.35 — 1.45 — 2.00 per pair.
364¼ Real Bronze Parliament Butts, No. 204......60
Real Bronze Parliament Butts, Nos. 31-32......40
Make list: No. 31, 1¾x2½, $6.00 — No. 32, 1¾x2½, 8.25
Florentine Bronze Parliament Butts, Nos. 8031-8032......40
Make list:
No........8031, 1¾x2½, $3.00 — No. 8032, 1¾x2½, 5.50
365, Shutter Bars, New York Pattern......30
Make list: Brass, 1¾ — 2 — 2½ — 3 inches,
$1.30 — 1.40 — 1.55 — 2.00
Shutter Bars, Ohio Pattern......30
Make list... Brass, 2-inch, $2.50
Brass, 3-inch, 2.70
Electro plated, 2 inch, 3.75
Electro plated, 3-inch, 4.00
Shutter Bars, Philadelphia Pattern......30
366, Shutter Bars, Nos. 8014 — 8015 — 9014 — 9015
Make list.......... $1.50 — 1.75 — 3.00 — 3.50
Shutter Bars, Nos. 11, 15, 19, 20, 21......20&5
Make list No. 15......$3.50
366¼, Shutter Bars, Nos. 8010, 8011, 8038, 8039....60
Make list No...... 8010 — 8011 — 8038 — 8039
$0.55 — 0.65 — 1.40 — 1.50
366½, Shutter Bars, Nos. 36 — 37......20&5
Make list......$4.10 — 4.40
367, Shutter Bars, Nos. 8030, 8031, 8034 and 8035...60
Make list Nos.......... 8030 — 8031 — 8034 — 8035
$0.90 — 0.95 — 1.40 — 1.50
Shutter Bars, Nos. 9030 and 9031......60
Shutter Bars, Real Bronze, all Nos......20&5
Make list:
Nos....... 30 — 31 — 34 — 35 — 50 — 050
$2.40 — 2.55 — 2.90 — 3.05 — 4.10 — 3.30
Nos....... 51 — 051 — 230 — 231 — 250 — 251
$4.35 — 3.60 — 2.40 — 2.55 — 3.30 — 3.60
368-368¼, Shutter Knobs, Real Bronze, all Nos. 25
Make list Nos..... 9 — 11 — 12 — 13 — 32
$1.30 — 2.50 — 2.50 — 2.50 — 1.65
Nos..... 33 — 37 — 43 — 52 — 252 — 253
$1.85 — 2.50 — 2.50 — 1.65 — 2.15 — 1.65
368, Shutter Knobs, Lava, all Nos......40
369, Sash Fasteners, Metropolitan......50
Sash Fasteners, Philadelphia......50
Sash Fasteners, Eccentric......40
Sash Fasteners, Y......40
Sash Locks, Jones......50
370, Sash Fasteners, Nos. 8000 to 8005......40&5
Sash Fasteners, Nos. 8007 and 8008......50&5
Add No. 8006, $1.45.
371, Sash Fasteners, Nos. 8009 and 8010......50&5
Sash Fasteners, Nos. 20 to 9136......45
372 and 372½, Sash Fasteners, all Nos......30
372¼, Sash Fasteners, Nos. 8160 to 8167......45
Sash Fasteners, Nos. 160 to 735......30
Sash Fasteners, Nos. 718 to 720......30
373, Sash Lifts......30
374, Sash Lifts, Nos. 8070-8077......33⅓
Sash Lists, Nos. 20-255......20
374½, Sash Lifts, No. 8001. Make list, $1.85....33⅓
374¼, Sash Lifts, No. 78. Make list, $1.65......20
374½-375, Sash Lifts, Nos. 8009, 8011, 8012 and 9012......50
Sash Lifts, Nos. 9-254......35
376, Sash Lifts and Pull, Nos. 8024, 8026, 8027......20
Sash Lifts, No. 24. Make list, $2.25......20&10
Bar Sash Lifts, Nos. 8025 9025......20&10
Make list......$0.85 3.25
376, Bar Sash Lifts......20&10
Sash Lift and Lock combined, No. 8100......60
Sash Lift and Lock combined, No. 100......40
376⅛, Bar Sash Lifts......20&10
376¼, Sash Lift and Lock combined, No. 200......40
376½, Sash Plates......20
376¾, Sash Plates, Nos. 59 and 259......20
Pull Down Hook, No. 8026......60
376⅞, Sash Plates......20
Sash, Pull Socket......20
377, Sash Plates, Real Bronze......20
377, Sash Pull Sockets, Nos. 8020 and 9020......20&10
Make list No. 8020, $0.70.
Nos. 20 and 23......20
Make list No. 20, $2.05.
Pull Down Hooks, all Nos......50
378, Sash Centers......33⅓
Sash Cord Irons......50
Window Springs......40
378¼, Sash Centers......33⅓
379, Sash Rollers......40
Trunk Rollers......40
Cupboard Buttons, Nos. 0 and 5......45&5
Cupboard Buttons, Nos. 1 and 2......40&10
Cupboard Buttons, Nos. 10 and 8060......40
380, Cupboard Catches, Rural......45
Cupboard Catches, Wrought Brass......45
381, Cupboard Catches, Cast Brass......45
Cupboard Catches, Kahala Bronze......60&10
Add No. 8011, same as No. 8012, 2 inches, $14.80 per gross......60&10
No. 8015, same as No. 8016, 2 inches, $14.80 per gross......60&10
382, Cupboard Catches, No. 8122. Make list $18.60......45
Cupboard Catches, No. 122......55
Cupboard Catches, Nos. 400 to 410......55
Cupboard Catches, Nos. 105 and 110......45
Add No. 100, Real Bronze same pattern as No. 400, $8 per doz......45
382⅛, Cupboard Catches, No. 43......55
382¼, Cupboard Catches......40
382½, Elbow Catches......40
382¾, Cupboard Catches......40
382⅞, Lever Cupboard Catch......33⅓
Add Nos. 610, $3.40 dozen; 9610, $18.50 gross.
383, Cupboard Catches, all Nos......40
384, Cast Brass Latches......33⅓
Show Case Joints......33⅓
384½, Transom Catch......30
385, French Window Catches......45
Add No. 8004¼, same as No. 8004, 1¼ inch, $11.40 gross......45
No. 8004½, same as No. 8004, 1½ inch, $12.50 gross......45
No. 8005¼, same as No. 8005, 1¼ inch, $11.40 gross......45
No. 8005½, same as No. 8005, 1½ inch, $12.50 gross......45
Transom Catches, Nos. 8750 and 9750......40
Make list, No. 8750, $2.30.
Transom Catches, No. 750......30
Cupboard Turns......40
386, Cupboard Turns, Nos. 150 to 8156......33⅓
Cupboard Turns, Nos. 414 to 420......45&5
386, Cupboard Turns, Nos. 115 and 120......60&5
386¼, Cupboard Turns, Nos. 416 to 422......45&5
Cupboard Turns, Nos. 116 and 121......60&5
387, Screen Door Catches......40&10
388, Drawer Pulls, Nos. 500 to 522......30
Add No. 8500, same as No. 500, Kahala Bronze, $4.75 per gross......30
Add No. 8520, same as No. 520, Kahala Bronze, $5.25 per gross......30
Drawer Pulls, Nos. 8001 to 8003......40
389, Drawer Pulls, Nos. 8004 to 8006......45
Drawer Pulls, Nos. 8007 to 8009......55
Drawer Pulls, No. 8012, make list, $6.75......45
390, Drawer Pulls, No. 8015, make list, $6.75......45
Drawer Pulls, Nos. 8028 and 8029......45
Drawer Pulls, Nos. 19 to 29......33⅓
390⅛, Drawer Pulls, Nos. 8128 and 8129......45
390¼, Drawer Pulls......33⅓
Drawer Pulls, Nos. 8016 to 8022......45
Add Nos...... 16 — 17 — 18 — 22
Per doz......$2.20 — 2.50 — 3.75 — 3.40......33⅓
390½, Surface Handles, Kahala Bronze......66⅔
Surface Handles, Galvanized......50
390¾, Chest Handles......60
391, Drawer Handles......45
Surface Handles......55
Make list: Nos...... 12 — 13 — 28
$2.80 — 3.85 — 4.25
392, Japanned Store Door Handles......60
393, Store Door Handles, Nos. 8001 and 8002......50
Add:
No. 8011, same as No. 8001, unground, $4.65....50
No. 8012, same as No. 8002, unground, $3.30....50
No. 8013, same as No. 8002, unground, $3.15....50
Without plate......50
Door Handles, No. 8090......55
394, Door Pulls, all Nos......40
Make list No. 8790, $0.85

394⅛, Door Pulls......40
Add Nos... 125 — 236 — 736 — 8507 — 8508 — 8736
Per doz....$5.25 — 4.40 — 4.40 — 0.50 — 0.70 — 0.90
394¼, Door Pulls, No. 8039......33⅓
395, Coat and Hat Hooks......33⅓
396, Coat and Hat Hooks......33⅓
397, Coat and Hat Hooks......45
Coat and Hat Hooks......33⅓
398, Coat and Hat Hooks, No. 8020......45
Coat and Hat Hooks, No. 120, make list $7.50......33⅓
Coat and Hat Hooks, Nos. 30 to 139......20&10
398⅛, Coat and Hat Hook, No. 055......20&10
Add Nos...... 26 — 026 — 126
$3.10 — 3.40 — 3.40
398¼, Coat and Hat Hooks......20&10
Coat and Hat Hook, No. 8125......45
398½, Ceiling Hooks......33⅓
399, School House Hooks......40
Clothes Line or Hammock Hooks......45&5
400, Harness Hooks......40
Cabin Door Hooks......33⅓
400¼, Cabin Door Hooks......33⅓
400½, Bird Cage Hooks......55
400¾, Chandelier Hooks......75&10
401, Chandelier Hooks......75&10
402, Box and Cotton Hooks......55
402¼, Flower Pot Brackets......33⅓
402½, Flower Pot Brackets......33⅓
Lamp Brackets......33⅓
403, Japanned Flush Ring......50&5
Brass Flush Rings......45
Box Chisels......55
404, Brackets, Nos. 1 to 9......35
Add No. 4½, 7 x 9......$3.00
No. 5½, 8 x 10......4.00
Brackets, Nos. 8010 to 8018......45
404½, Brackets, Nos. 40 to 51......35
404¼, Brackets, Nos. 8030 to 8038......45
Brackets, Nos. 30 to 38......45
405, Brackets, Nos. 8020 to 8028......45
Brackets, Nos. 20 to 28......45
406 Pulleys, Nos. 103-126......30
Pulleys, Nos. 21-28......33⅓
407 Pulleys......33⅓
408 Pulleys, all Nos......33⅓
408¼ Pulleys, all Nos......33⅓
408½ Pulleys, No. 245......55
Pulleys, No. 225......55
Pulleys, No. 255......55
409 Pulleys, Brass Screw......45
Pulleys, Dumb Waiter......50
Refrigerator Ventilators......45
410 Brass Ship Bolts, Nos. 200-201......40
Brass Ship Bolts, No. 202......45
Brass Ship Bolts, Nos. 203, 204, 205......40&10
411 Brass Ship Bolts all Nos......40&10
412 Brass Barrel Bolts, No. 210......50
Brass Barrel Bolts, Nos. 1-37......55
412½ Barrel Bolts, No. 221......65
413 Barrel Bolts, No. 8000......45&5
Barrel Bolts, No. 8001......55
Add...... 5 — 6 inch.
$3.00 — 3.75
Barrel Bolts, No. 701 — 2½ — 3 — 4 inch....33⅓
Make list...... $4.25 — 4.85 — 5.50
Barrel Bolts, No. 700......40
Make list...... 5-inch, $9.85
414, Square Cased Bolts, No. 8002......40&10
Square Cased Bolts, No. 702......25
Square Cased Bolts, Plain Brass......30
Add No. 212, inch...... 3 — 4
Per doz......$4.85 — 6.10
Square Cased Neck Bolts, No. 8003......40
415, Square Bolts, No. 8204......55
Bottom Bolts, No. 8205......55
416, Crosby's Bolts......60&10
Brass Iron Mortise Bolts......40&10
416¼, Crosby's Bolts......60&10
417, Brass Chain Bolts......45
Brass Foot Bolts......40&5
418, Japanned Chain Bolts, No. 230......55&5
Kahala Bronze Chain Bolts, No. 8130......40&10
418½, Kahala Bronze Latch Bolts......40
418¾, Japanned Chain Bolts, No. 280......55&5
419, Japanned Foot Bolts, No. 231......55&5
Make list, 8-inch, $4.50.
419, Kahala Bronze Foot Bolts, No. 8131......55
Add 4-inch, $3.50.
420, Cupboard Bolts, Nos. 50-61......30&10
Cupboard Bolts, Nos. 8050-8051......40&5
Cupboard Bolts, No. 150, Make list $3......25
Eccentric Bolts, Nos 8054 and 154......25
421, Brass Flush Bolts, Nos. 100-105......45&5
Brass Flush Bolts, No. 106......45&5
422, Brass Flush Bolts, Nos. 107-108......45&5
Brass Flush Bolts, Nos. 109-110......45&5
Brass Flush Bolts, Nos. 120-121......40
423, Flush Bolts, No. 8106......40
Add No. 8105, same as 8106, unground......30&5
Flush Bolts, No. 9106......25
Flush Bolts, No. 47......20&10
424, Flush Bolts, Nos. 8115 and 8116......25
Flush Bolts, No. 48......20&10
425-427, Flush Bolts, No. 20......40
Flush Bolts, all other numbers......20&10
428 Brass Flush Bolts......20&10
428¼ Surface Door Bolt......40
428⅜ to 429 Mortise Flush Bolts, all Nos......30&5
428⅝-429, Mortise Flush Bolts all Nos......30&5
Make list:
No. 025 is same as No. 25, without line.
430, Chain Door Fasteners......40
Make list, Nos: 1 — 2 — 3 — 5
$2.50 — 9.30 — 21.65 — 21.65
430¼, Chain Door Fasteners......50
Add No. 110, $14.75, same as No. 8010, Real Bronze.
430½, Chain Door Fasteners......33⅓
Make list No. 215, $20.
431, Chain Door Fasteners......33⅓
432, Chain Door Fasteners......33⅓
432½, Letter Box Plates......40
Make list, Nos...... 235 — 20 and 21
$12.25 — 11.00
433, Letter Box Plates......30
Make list, Nos.... 1 — 3 — 5 — 8003 — 8005
$10.20 — 7.05 — 6.00 — 1.90 — .55
Letter Box Plates......40
Make list, Nos...... 35 and 8035
$12.25 — 3.35
434, Letter Box Plates......30
434½, Letter Box Plates, all Nos......30
435, Letter Box Plates, No. 36, $12.25; No. 8036, $3.35......40
Letter Box Plates, Nos 39 and 8039......33⅓
436, Door Bells......55
Add Nos...... 35 — 36 — 37 — 38 — 39
Per doz...... $15.20 — 18.60 — 9.80 — 15.20 — 18.60
Same as No. 30, &c., Size, 4 inch.
436½, Levers......55
437, Levers......55
438, Levers......55
439, Bells......50
440, Bells......50
441, Escapement Gongs......25
House Bells......45
Bell Carriages......25
442, Bell Carriages......20&10
443, End and Side Cranks......33⅓
Mortise Cranks......40
Check Springs......55
Ferrules......40
444, Shutter Screws......40
Shutter Lifts......40
Stubs and Plates......40
Shutter Locks and Keys......40
445, Blind Adjusters......50
Transom Lifters......50
Add No. 10......45
Feet.. 3 — 4 — 5 — 6 — 7 — 8
Each.. $0.90 — 1.05 — 1.20 — 1.35 — 1.50 — 1.65
446, Plumb Bobs......40
Ox Balls......30
Make list, Nos...... 56 — 57 — 58 — 59
$4.60 — 6.45 — 7.35 — 8.60
Twine Boxes......33⅓
Cork Squeezers......45
Boot Jacks......25
446½, Candlesticks......45
446¼, Match Safes......45
446¾, Steel and Iron Squares......60
447, Brass Spurs......50
Bed Joint Fasts......45
448, Ladder Sockets......45
Gate Bar Sockets......45
Gate Pulley Chain and Ball......45
449-454, Polished Fire Irons......45
454, Polished Steel Spring Tongs......45
454¼, Kahala Bronze Fire Irons......45
455, Iron Coal Tongs......45
455-459, Fire Iron Stands......45
460-460¼, Home Fire Irons, &c......33⅓
461, Iron Shovels and Tongs......55
Brass Head Shovels and Tongs......55
462, Brass Head Shovels and Tongs......50
Pokers......50
Poker and Lid Lifter, combined......50
463, Jamb Hooks......33⅓
465, Bake Pans......45
Waffle Irons......45
466, Hale's Meat Cutters. Add No. 10, 4-inch cylinder, $24 per doz......60&10
467, Meat Cutters......40
498-501, Padlocks......66⅔
501, Padlock Keys......66⅔

502, Padlocks, Circular and Switch......66⅔
502½-504¾, Padlocks, Scandinavian......75&10
509, Screws, Revised List, February 15, 1886.
Flat Head Iron......net, 75&10
Round Head Iron......net, 70&10
Oval Head Iron......net, 70&10
Flat Head Brass......net, 75
Round Head Brass......net, 70
Oval Head Brass......net, 70
Flat Head Bronze Metal......net, 75
Round Head Bronze Metal......net, 70
Oval Head Bronze Metal......net, 70
Flat Head, Japanned......70
Round Head, Japanned......65
Flat Head, Kahala Bronze......70
Round Head, Kahala Bronze......65
Flat Head, Tinned......66⅔
Round Head, Tinned......60
List of Iron Screws:
510, Flat Head Iron Screws, Bronzed......55
Round Head Iron Screws, Bronzed......50
Flat Head Iron Screws, Coppered......55
Round Head Iron Screws, Coppered......50
Flat Head Iron Screws, Silver Plated......55
Round Head Iron Screws, Silver Plated......50
List of Brass Screws:
Flat Head Brass Screws, Bronzed......50
Round Head Brass Screws, Bronzed......45
Flat Head Brass Screws, Silver Plated......45
Round Head Brass Screws, Silver Plated......45
List of Nickel Plated Iron Screws:
Flat Head Iron Screws, Silver Plated and Burnished......45
Round Head Iron Screws, Silver Plated and Burnished......45
List of Nickel Plated Brass Screws:
Flat Head Brass Screws, Silver Plated and Burnished......45
Round Head Brass Screws, Silver Plated and Burnished......45
Side Knob Screws, Blued, $0.42 per gross......66⅔
Tinned, $0.42 per gross......55
Iron, Silver Plated, $0.42 per gross......45
Brass, $1.09 per gross......60
Brass, Bronzed, $1.09 per gross......40
Brass, Silver Plated, $1.09 per gross......40
511, Nickel Plated Screws. Revised list, February 15, 1886.
Flat Head on Iron......net, 70&10
Round Head on Iron......net, 70
Flat Head on Brass......net
Round Head on Brass......net
511, Cancel list of Piano Head Iron, and Round and Flat Head Iron and Brass.
513, Machine Screws.
Flat Head Iron......net, 60
Round Head Iron......net, 55
Fillister Head Iron......net, 55
Flat Head Brass......net, 60
Round Head Brass......net, 55
Fillister Head Brass......net, 55
514, Stove Bolts.
Flat Head......net, 70
Round Head......net, 70
Flat Head, Nickel Plated......net, 70
Round Head, Nickel Plated......net, 70
Wagon Rivets......net, 45
3-16 x ⅝ $0.17 — ⅛ inch and longer, .14 per pound.
¼ x ⅝ $0.14 — ⅛ inch and longer, .13 per pound.
514¼, Tire Bolts......net, 60&10
Sink Bolts......net, 70
Coach Screws......net, 75
514½, Steel Wire Nails, revised list, Nov. 11, 1885......net, 50
Steel Molding Nails, revised list, Nov. 11, 1885......net, 50
For Barbed Nails, add 1 cent per pound to list.
For Special Heads or Points, add 1 cent per pound to list.
For Tinned Nails, add 50 per cent. to list.
Nails packed in ½-pound papers, add 1 cent per pound net.
Nails packed in ¼-pound papers, add 2 cents per pound net.
514¾, Steel Wire Carpet Nails—Blued......net, 50

Ounces	4	6	8	10	12	14
Hf.-weight, per doz	$0 60	.65	.75	.80	.90	1.00
Qr.-weight, per doz	.30	.33	.38	.40	.45	.50
Bulk, per pound	.44	.34	.30	.28	.26	.24

Steel Wire Carpet Nails—Tinned......net, 50

Ounces	4	6	8	10	12	14
Hf. weight, per doz	$0.80	.90	1.00	1.10	1.20	1.35
Qr.-weight, per doz	.40	.45	.50	.55	.60	.68
Bulk, per pound	.58	.42	.36	.33	.31	.29

Steel Wire Brads......net, 50

Inch	⅜	½	⅝	¾	⅞
Per doz	$1.40	1.25	.95	.85	.75
Inch	1	1¼	1½	1¾	2
Per doz	$0.70	1 20	1.15	.95	.95

⅜ to 1 inch, ¼ pound in a box.
1¼ to 2 inch, ½ pound in a box.
516-524, Cabinet Locks......40&2
525, Cabinet Locks......25&2
526-536, Cabinet Locks......40&2
537, Cabinet Locks......25&2
538-546, Cabinet Locks......40&2
547, Cabinet Locks......25&2
548-551, Cabinet Locks......40&2
(Changed list given.)
559, Cabinet Keys and Blanks......40&2
Trunk and Bag Blanks......40&2
Assorted Keys and Blanks......40&2
Cabinet Escutcheons......25&2
561-571, Trunk Locks......25&2
571, Plate Locks......33⅓&2
572, Jail Padlocks, Nos. 0000 to 2......15
573, Jail Padlocks, Nos. 135 to 149......25
575, Cast Loose Pin Butts, No. 90......66⅔&10
Cast Loose Joint Butts, No. 84......66⅔&10
576, Cast Loose Pin Butts, Nos. 91 and 92...66⅔&10
Cast Loose Joint Butts, Nos. 88 and 89...66⅔&10
577, Cast Fast Joint Butts, No. 80......55&10
Cast Loose Joint Butts, No. 83......66⅔&10
Cast Fast Joint Butts, No. 82......55&10
578, Cast Parliament Butts, No. 85......66⅔&10
Cast Mayer's Hinges, No. 86......66⅔&10
Cast Parliament Butts, Nos. 76 and 77...66⅔&10
Wrought Parliament Butts, No. 738......55&10
Wrought Parliament Butts, No. 734......55&10
579, Wrought Loose Joint Butts, No. 806.60&10&7½
Wr't Loose Joint Butts, Nos. 708 and 700...55&10
580, Wrought Loose Pin Butts, No. 804...60&10&7½
Wr't Loose Pin Butts, Nos. 726, 728 and 730.55&10
581, Wrought Fast Joint Butts, No. 808......60&10&5
Wrought Table Butts, No. 810......60&10&5
Wr't Narrow Butts, Nos. 800 and 838......60&10&5
582, Wr't Loose Pin Butts, Nos. 840 and 834.60&10&5
Wrought Inside Blind Butts, No. 842......60&10&5
Wrought Back Flaps, Nos. 814 and 816..60&10&5
Bronzed Butts, Nos. 332, 284 and 288......40&10
583, American S. S. Butts......30
584, Union Spring Hinges......30
Gem S. S. Butts......30
586, Acme Spring Hinges......70
586½, Empire Spring Hinges......60&10
586¾, Empire Spring Hinges......60&10
587-588, Strap and T Hinges......65&5&2
588, Hart's Patent Hinges......40&10
Record's Patent Hinges......40&10
589, Long Chest Hinges......65&5&2
Crate Hinges and Hasps......65&5&2
Hinge Hasps......65&5&2
Rolled Plate and Raised Hinges......70&10
Hook and Eye Hinges......60&10
590, Plate Hinges......net
6 to 12 inches......4 cents per pound.
14 inches and up......3 cents per pound.
Hook Hinges, Nos. 1 and 2......net
8, 10 and 12 inches, 4 cents per pound......net
14 inches and up, 3 cents per pound......net
Welded Hook Hinges, Nos. 3 and 4......60&10&5
591, Clark's Gravity Blind Hinges......80&2
Clark's Mortise Blind Hinges......50&2
Improved Gravity Blind Hinges......80&10
Parker's Blind Hinges......75&2
592, Rolled Blind Hinges......70
Rolled Center Blind Hinges......50&10
Vansand's Screw Blind Fasts, $5.50 per gross......net
Vansand's No. 3705 Blind Fasts......50&10
593, Mackrell's Oval Blind Fasts......55&10
Cast Turnbuckles......60&10
Wrought Turnbuckles......60&10
Drops and Pins......70&10
594, Clark's Gate Hinges and Fasts......60&10&2
Clark's Pattern Gate Hinges and Fasts.6 &10&10
595, New York State Gate Hinges......55&10
Empire Gate Hinges......55&10
596, New England Gate Hinges......55&10
596¼, Reed's Automatic Gate Hardware......50
597, Gate Latches, Nos. 119-122......60&10
Gate Latches, Nos. 1, 2, 3 and 4......55&10
Drop Thumb Latches, No. 10......60&10
Drop Thumb Latches, No. 12......65&10
Thumb Latches, Nos. 0-4......60&10
Thumb Latches, Nos. 100-104......60&10
598, Barn Door Latches......60&10
Barn Door Hasps and Latches......60&10
599, Cast Door Bolts......60&10
Cast Shutter Bolts......60&10
Staples and Floor Plates for Square Bolts.60&10
600, Wrought Barrel Bolts......60&10&10

601, Wrought Square Bolts......55&10
Wrought Shutter Bolts, No. 1110......60&10
602, Wrought Shutter Bolts, No. 1114......40&10
Wrought Neck Bolts, No. 1102......85
Wrought Neck Bolts, No. 1100......35
Wrought Tower Bolts, No. 1104......30&10
Wrought Spring Bolts......70
Wrought Spring Neck Bolts......70
603, J. & B. Sash Fasts......35
Judd's Sash Fasts, Nos. 400-404......60&10&10
604, J. & B. Window Spring Bolts......35&10
Judd's Sash Bolts, No. 305......40&10
J. & B. Window Springs, Nos. 300-302......45&10
King's Sash Supports......33⅓
Clark's Sash Locks......33⅓
605, Walker's Sash Fasteners......10
Domestic Blind Adjusters......30
Blind Slat Tenons......70
606, Pocket Clothes Racks......20
Hat and Clothes Racks, "W."......50
Extension Clothes Racks......40
Eureka Towel Racks......50
Excelsior Towel Racks......30
Miles's Coat and Hat Hooks (No. 7 Discarded) 70
Coles's Coat and Hat Hooks......50&10
607, Wardrobe Hooks......60&10
608-609, Coat and Hat Hooks......60&10
610, Schoolhouse Hooks......70
Harness Hooks......60&10&10
Ceiling Hooks......60&10
Ceiling Hooks......60&10&10
614, Paper Files......50&10
615, Paper Clips......60&10
Paper Weights......50&10
Pen Racks......50&10
616, Pulleys, No. 05......45&10
Pulleys, Nos. 0125, 011, 012, 013......50&10
Clark's Pulleys, Nos. 10, 20......30
618, Tackle or Awning Pulleys......65&10
619, Hot House Pulleys......65&10
Hay Fork Pulleys......60
Hay Fork Pulleys, Anti-Friction......60
620, Clothes Line Pulleys......60&10
Well Wheels. Change list, 12 in, $11.25...60&10
Barn Door Stays......55&10
Union Barn Door Rollers......70
Barn Door Rollers......60&10&10&10
620¼, Terry's Barn Door Hangers......50
Terry's Barn Door Rail, per ft., 5¢......10
621, Barn Door Hangers, Round Groove......75&10
Barn Door Hangers, Square Groove......70
Barn Door Hangers, Cheritree's......50&10&10
Barn Door Hangers, R. & W......60&10
Barn Door Rail, Double Flange......60&10
622, U. S. Barn Door Hangers......60&10
Duplex Barn Door Hangers......60
Kidder's Barn Door Hangers......50&10
Barn Door Rail......80&10
Barn Door Pulls......70&10
623, Truck Casters, Swivel......10
Truck Casters, Stationary......45&10
Bracket Bed Casters......50&10
624-625, Martin's Patent Casters......40&10
625, Stove Trucks. Change list, $2.50......33⅓
626, Bed Casters......50&10
627, Plate Casters......50&10
Philadelphia Plate Casters......50&10
Shallow Socket Casters......50&10
Deep Socket Casters......30&10&10
628, Japanned Bed Keys......50&10
Ratchet Bed Keys......15
Brush Foot Scrapers......net
629, Japanned Foot Scrapers......50&10
630, Flush Drawer and Chest Handles......70
Wrought Chest Handles......60&10&10
631, Japanned Lifting Handles......60&10&10
Brass Lifting Handles......60&10&10
Japanned Cabin Door Hooks......60&10
Brass Cabin Door Hooks......60&10
Japanned Lamp Hooks......55&10
Brass Lamp Hooks......55&10
632, Japanned Cup Hooks......70&10
Brass Cup Hooks......70&10&10
Brass Wire Cup Hooks......70&10
Looking Glass Hooks......70&10
Brass Acorn Tipped Screw Hooks......70&10
632, Brass Screw Hooks......70&10
Brass Wire Screw Hooks. Change list, ⅛ in., $2.70......70&10
Brass Drive Hooks......70&10
633, Malleable Hooks and Eyes......70
Brass Hooks and Eyes......60&10
634-637, Bright Wire Goods, Revised list......75&10
637, Tinned Wire Meat Hooks......80&10
638, Gem Door Springs......50&10
Star Door Springs......60&10
Torrey's Door Springs......60&10&10
Hercules Door Springs......50
Warner's Door Springs......40&10
Rubber Door Springs......55&10
639, Porcelain Picture Knobs, Nos. 0 to 3......70&10
Porcelain Picture Knobs, Nos. 129 to 131......70
Brass Capped Picture Nails......50
640, Picture Nails, Nos. 44 to 47......70
Picture Nails, all others......40
641, Picture Nails......40
Glass Curtain Pins......net
642, Brass Picture Hooks......40&10
Judd's Patent Picture Hooks......40
Tassel Hooks......40
643, Rack Pulleys, No 100......50
Rack Pulleys, Nos. 00 to 7......40
Roller Ends......40&10
Shade Brackets......50&10
644, Wire Picture Cord, Tinned......60&10&10
Wire Picture Cord, Gilt......60&10&10
Upholsterers' Nails......40&10
China Nails and Disks......50
645, Drop Handles, No. 69......75
Drop Handles, No. 12......50
Drop Handles, Nos. 14, 13½ and 13......70
Escutcheons, Nos. 3 and 4......70
646, Silver Lake Sash Cord, Quality A......10&10
Silver Lake Sash Cord, Quality B......15&10
Silver Lake Sash, Cord, Linen......10
Add Quality "C" Braided Cotton Sash Cord 50 cents per pound......33⅓
American Hemp Sash Cord, Nos. 0 and 2
Change list 0 to 20 cents per pound......40
Change list 2 to 25 cents per pound......40
Add Indian Thread Patent Laid Sash Cord N0.6, Change list to 22 cents per pound......40
Add Cable Laid Indian Hemp Sash Cord No. 3
Change list to 25 cents per pound......40
Champion Sash Chain......60&10
Fastenings for Champion Sash Chain, List 28 cents per Window......60&10
Cable Sash Chain......60
Cable Chain Fastenings. List 50 cents per Window......60
647, Wrought Iron Goods, all......75&10
648, Bent Hasp and Staples......7 &10
Wagon Bow Staples......70&10&10
Lap Links......80&10
Trap Door Rings......75&10
Awning Hooks......50&10
648, S Hooks......70&10&10
649, Meat Hooks......70&10&10
Hitching Hooks and Rings......70
Hitching Rings......70
Hinge Nails......55&10
Hinge Rivets......45&10
Wagon Nails......45&10
650, Hammock Hooks......60&10&10
Belt Hooks......75&10
Belt Studs and Cutters, &c......25&10
652, Carpenters' Slicks......70&10
Framing Chisels, Extra......75
Framing Chisels, No. 1......75&5
Corner Chisels......75
Framing Millwright Chisels......70&10
Farmers' Framing Chisels......70&10
653, Socket Firmer Chisels, Extra......75
Socket Firmer Chisels, No. 1......75&5
Socket Firmer Paring Chisels......25
Socket Firmer Millwright Chisels......25
Socket Coach-Makers' Chisels......25
654, Socket Firmer Gouges......25
Socket Millwright Gouges......25
Socket Paring Gouges......25
Tanged Firmer Gouges, Extra......40
Tanged Firmer Gouges, No. 1......40&10
655, Tanged Firmer Chisels, Extra......40
Tanged Firmer Chisels, No. 1......40&10
Tanged Firmer Paring Chisels......40
Tanged Firmer Coach Makers' Chisels......40
656, Tanged Firmer Millwright Chisels......40
Tanged Firmer Millwright Gouges......40
Tanged Firmer Paring Gouges......40
Tanged Turning Chisels and Gouges......40
657, Drawing Knives, Razor Blade......75
Drawing Knives, Extra......75
Drawing Knives, No. 1......75&5
Drawing Knives, Carriage Makers'......70&10
Drawing Knives, Wagon......70&10
Drawing Knives, Farmers'......70&10
Drawing Knives, Shingle......70&10
Drawing Knives, Adjustable Handle......30
658, Cook's Augers and Bits......50&10
659, Cook's Bits......50&10
Cook's Car Bits......50&10
Cook's Handled Auger Bits......50&10
Cook's Machine Bits, 3, 4 and 6 inch......30&10
Cook's Machine Bits, 9 and 12 inch......20&10
Jennings' Pattern Bits......50&10
660, Douglass Millwright Augers......50&10
Douglass C. S. Augers, Extra......60&10&5
Douglass C. S. Augers, No. 1......60&10&10
Douglass Post Augers......60
Douglass Gas Augers......60

660, Douglass Boring Machine Augers......60&10&5
Add Swan's Expansive Boring Machine Augers, No. 5, cutting from ¾ to 3½ inch, $40 per doz......25&10
Extra Cutters, No. 7, ¾ to 1¾, $5.25 per doz......25&10
Extra Cutters, No. 8, 1⅛ to 2½, $6 per doz.25&10
661, Douglass Ring Augers......60
Douglass Long and Short Bright Augers......60
662, Douglass Bits, Extra......60&10&5
Douglass Bits, No. 1......60&10&10
Douglass Car Bits......60
Douglass Machine Bits, 3, 4 and 6 inch......20&10
Douglass Machine Bits, 9 and 12 inch......20&10
662¼, Swan's Patent Expansive Bits......25&10
Extra Cutters for Swan's Expansive Bits..25&10
662¾, Swan's No. 7 Perfect Auger Bits......60
663, Douglass D. C. Gimlets and Bits......40&10
Douglass Gimlet Bits......40
Douglass Reamers......10
Douglass Auger Handles......net
Swan's Auger Handles......net
664, Douglass Gimlets, Metal Head......40&10
Douglass Gimlets, Cocoa and Wood Head......40
665, Douglass Improved Hollow Augers......25&10
Douglass New Pattern Hollow Augers......25&10
Douglass Universal Hollow Augers......20
Douglass Plug Cutters......10
Douglass Spoke Trimmers......20
Douglass Tap Borers, List of 1 inch. $3.75, 20&10
666, Douglass Boring Machines, Nos. 1 to 5......50
Douglass Boring Machine Augers......60&10&5
Cook's Boring Machine Augers......50&10
668, Douglass Screw Drivers, Rosewood..20&10&10
Douglass Screw Drivers, Extra......20&10&10
Douglass Screw Drivers, No. 1......20&10&10
Douglass Screw Driver Bits......10
Douglass Countersink Bits......10
668¼, Swan's Patent Screw Drivers......40&5
668½, Swan's Screw Driver, Nos. 40 and 45......20&10&10
669, Ratchet Screw Drivers......35
Clark's Screw Drivers, No. 1......20&10
Clark's Screw Drivers, No 20......20&10
Excelsior Screw Drivers and Wrench......45&10
670, Mortising Machines......20
Nail Sets......85&10
Morse Bit Stock Drills......50&10
Ship Augers and Bits......15
671, Jennings's Auger Bits. Revised list......25
Clark's Expansive Bits......25&10
(To be continued.)

ARRANGEMENT OF HARDWARE STORES.

We give below a number of suggestions on this subject, with descriptions of methods for handling certain goods, all of which are referred to by our contributors as having been found in experience to be practicable and convenient. They will be found to be suggestive, and we trust serviceable, to many Hardwaremen.

Referred to our Readers.—A correspondent will esteem it a favor if suggestions are made on the following points:

1. The best plan for a Glass Rack to carry Glass ranging from 8 x 10 to 12 x 36, economy of space, convenience and neatness being the essential points.

2. What is the best way to keep Hollow-Ware and to sample the same?

3. How most advantageously to handle Files?

4. The most convenient methods of keeping Bar Iron, and Wrought Iron Pipe; also Dry Paints, like Yellow Ocher, Venetian Red, &c.

5. One of our correspondents, to whom we are indebted for the suggestion of an arrangement which has been very favorably regarded by many in the trade, is desirous of suggestions as to the relative merits of the ladder and truck arrangement of Morley Bros., East Saginaw, Mich., as compared with a balcony surrounding the store, half way up the shelving, which is supposed to be built to the ceiling. He mentions that he finds advocates of both plans, but has no decided preference either way. He desires to adopt one or the other method, but is in doubt as to which is best.

6. A Hardware merchant of this State, in connection with the discussion as to the arrangement of Hardware stores, requests us to invite suggestions from the trade as to the style of Scale retail merchants find most convenient for weighing out Nails. We shall be glad to have replies from many Hardwaremen in regard to this matter.

The following communication, which comes to us from Cleveland, gives a description of

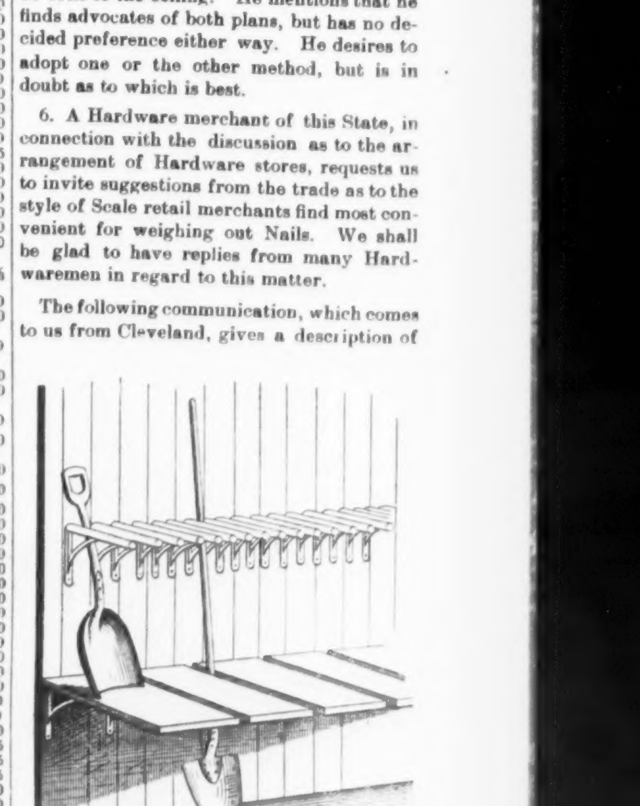

Fig. 1.—Rack for Shovels, Forks, &c.

a method for handling Steel Goods, Shovels, &c., which is quite different from any we have laid before our readers:

I have been following your correspondent's suggestions regarding the arrangement of Hardware stores with much interest, and hope to contribute to the solution of the questions how to arrange certain lines of goods in the best possible manner for retail purposes with convenience and a good display. If I were able to make a good perspective drawing of the idea I desire to convey to you it would not be necessary for me to go into a detailed description of the method I have for sampling Shovels, Spades and Steel Goods generally. These

goods consist of D Handled Shovels, Spades, Coal Shovels, Coal Forks, Coke Forks, Manure Forks, Spading Forks and Scoops and Long Handle Shovels, Spades, Manure Forks, Spading Forks, Hay Forks, Grain Forks, Potato Hooks, Field Hoes, Rivet, Socket, Shank, Planter's Hoe, Mortar Hoes and Steel, Malleable, Wire and Wooden Rakes. The variety of these goods kept in stock and called for, varies so much according to the seasons, localities and the extent of the merchant's business that a general statement as to dimensions cannot be given. The method for the arrangement of these goods which I think is the most practical, is to lay out the goods as the following plan suggests, and construct the size of the shelving accordingly. A platform should be built 3 inches from floor and 18 to 20 inches wide, with a slightly projecting footboard around it, beveled on the inside to a level with platform, for the purpose of removing the dust with ease. This width will allow six implements to rest over each other. The sides should be closed and the back against the wall ceiled to a hight of at least 7 feet. Place alternately D handled and long handled implements in the rack, raising the D handled ones on shelves high enough to clear the blades of the long handled ones, as shown in Fig. 1. The hight of shelf above platform should be about 18 inches, if uniformity is desired; however, it might vary from 12 to 18 inches, as the goods on the platform may require, and the effect will then be satisfactory if the lower goods are at the side

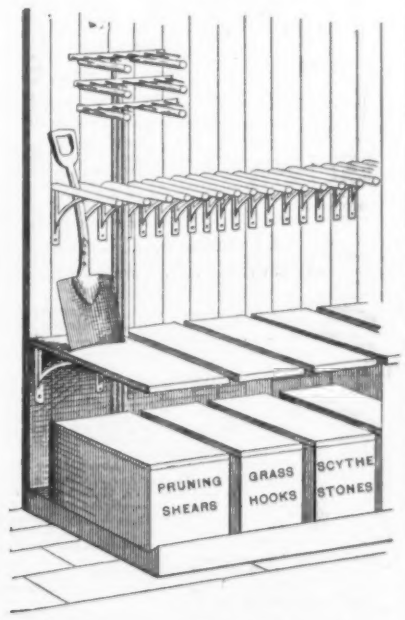

Fig. 2.—Rack for Shovels, Rakes, Hoes, &c.

nearest to the front of the store. Fasten these shelves on the ceiling as deep as the platform and just wide enough to form with their opposite edges a secure opening, to take in one long handle at a time. Use japanned brackets for supporting the shelves and also for supporting the pins, a row of which will keep the upper ends of the D and long handled goods in line. This method of sampling can be applied to Shovels, Spades, Forks, Scoops, &c., of all kinds. The shelves can be supported by brackets. The pins should be of wood. They may be fork handles sawed down to a flat bearing on one side, and then secured in place by cast iron brackets. For Rakes and Hoes I propose a similar method of handling, which my sketch, Fig. No. 2, is intended to illustrate. The main difficulty is the bulkiness of these goods, but by using wooden pins as supports long enough to hold at least a half dozen, and securing them to the wall with brackets and then alternately hanging the Rakes or Hoes up and standing them on the platform, room may be saved. There will be more or less room available under the shelves which can be utilized for such goods as Scythes, Scythe Stones, Grass Hooks, Gardeners' Trowels, Floral Tools, Bush Hooks, Straw Knives, &c., in boxes with hinged covers, as indicated. A rack of this description should be placed in the center or rear of the store close to the wall, but never should be placed in the middle of the store away from the wall, as this would spoil the effect. Over it the regular shelving of side wall should be carried along, thus finishing off the top and harmonizing the effect of Shelf and Steel Goods.

The following communication gives the principal points of arrangement in connection with the accompanying diagram, and refers to other matters in relation to desirable methods of handling Hardware:

To the Editor of The Iron Age: I have read with much interest the different ideas put forth in your paper of late, and cannot forbear expressing my experience in the arrangement of a Hardware store. An experience of nearly 35 years in the retail country Hardware trade has enabled us to arrange one that does very well without going into elaborate fixtures, &c., and answers our purpose very well. I inclose sketch of our store and general arrangement. I would have, if I could, a store 30 feet wide and 110 to 120 feet long, so as to give more floor space for Stoves and Agricultural Implements in their season, as in a country store, where every little line must be represented, it needs much space, but we get along very well by removing unseasonable goods. You will notice our show-windows are large and the entrance is broad. We have an open space between windows and shelves. This w e occupy on the right-hand side with X-cut Saws and display of such goods as we wish to hang up. The first space of 4 feet in shelving is a Showcase for Guns, display of Tools, &c. All the rest of the spaces are 3 feet, with movable shelves, to be adjusted to the goods put up. Above the cornice we store such surplus stock as we cannot put on the shelves. Below the broad shelf and drawers are spaces for Planes, Levels and bulky goods which do not look well on the shelves. Our counters are divided with partitions for Hinges, Sledge Hammers, Sad Irons, Barn Door Hangers and Rail, &c., an arrangement we think quite convenient. The left side is occupied by tinware about half the distance, the rest being devoted to Carriage Bolts, Brass Goods for water and steam, &c., and above the cornice the more bulky articles of Tin, such as Receivers, Toilet Sets, &c., are stored. Our elevator is placed at the side, and runs from the cellar to the third floor, where our tinshop is located, and where our Stoves are blacked and placed on movable platforms for exhibition and let down to main floor. Our second floor is used for storage. Having the tinshop on the third floor prevents the noise from disturbing the store below. Our Iron and Nails are all in cellar, the Iron in short bundles held on pins along the side, and the long Bars in a rack of pigeon holes. Our Nails and Glass occupy the other side. Horseshoes and Building Paper occupy a space at the end of the Iron Rack in center of cellar. We might mention other details, but will not do so, but you can see from this outline our general arrangement. I will only add that I prefer goods put on the shelves in the original packages in which such goods are now put up to the use of wooden boxes, because, for one reason, wooden boxes occupy too much space to display all goods, and, besides, the samples will not be kept in as good order as when a fresh sample is taken out at each sale. Our office is at the rear of store, and commands a view of the whole. C.

The accompanying diagrams represent Racks for Shovels, Spades, Rakes, &c., but which may be used, as our correspondents indicate, for other goods when they are not

Fig. 1.—Rack for Shovels, Forks, &c.

required for these special lines for which they are especially adapted. After referring to their construction, which is sufficiently indicated by the cuts, our correspondent says:

In Rack Fig. 1 the cross pieces, or the pieces on which D-Handle Shovels are hung, are square, so that the Shovels will hang straight, as if they were round. A D-Handle Shovel would sometimes hang on one side of the D Handle, and the next, perhaps, on the other side, which would not look well. Rack Fig. 2 is made somewhat different on top, and is intended for Hoes and Rakes, and which we also use to hang on Robes, Horse Blankets, &c., when other goods are out of season. These Racks can be made any length. One of ours is 6 feet long and the other 5 feet. They are portable, but are fastened to the floor by lag screws, and can readily be removed from one place to another. When the goods are in season we move the Racks up to the front part of the store to one side, and place them somewhat diagonally across the floor, so that a person coming in gets a good view of both Racks, which are also in sight from the street. When out of season we move back the Steel Goods Rack and occupy the space with Stoves and other seasonable goods. We also have two platforms the width of the base and as long as the Rack, one 8 inches high and the other 4 inches, on which we place Farm Bells, Drag Teeth, Double Shovel Plow Blades, &c. When the Racks are not large enough we have put heavy screw eyes in the ceiling, and suspended a rod just over the Racks, on which we have hung Hoes and Rakes.

Fig. 2.—Rack for Rakes and Hoes.

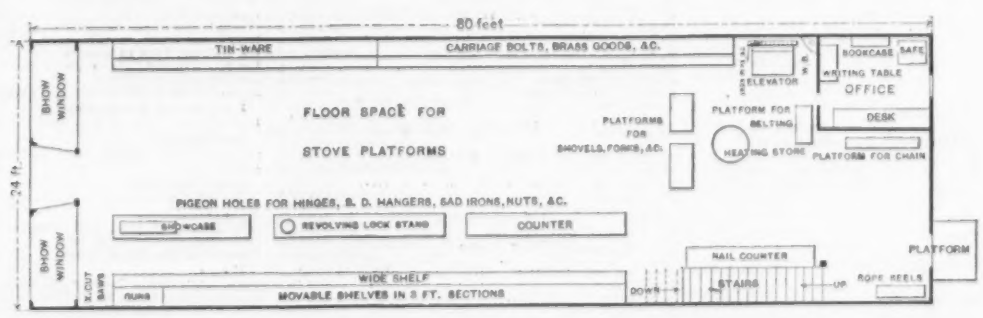

Diagram of Store as Arranged by C.

English Letter.

(*From Our Regular Correspondent.*)

LONDON, FEBRUARY 15, 1886.

THE UNEMPLOYED

have been exceedingly, and one may say unpleasantly, prominent since I last wrote. When my last week's letter was being written the meeting in Trafalgar square was in progress, and I did not anticipate the results that actually came about. The telegraph will have made you aware of what happened; hence I need not repeat the story here. I may say, nevertheless, that the rioting which took place at the close of the meeting and the subsequent pillaging of shops were in no sense attributable to the *bona fide* workingmen. For some reason or another yet to be ascertained the police were inert, and the thousands of thieves, rogues and vagabonds managed to get the upper hand for two hours. We have some 30,000 of these classes in this huge metropolis, and it speaks well for the love of order and respect for the law of our populace that this is the only occasion over a very long series of years on which the Ishmaelites were in the ascendant for 120 minutes. Since then there have been rumors of mob law and further violence, but London is yet unmoved, and we are not under the slightest apprehension of any serious breach of the peace. You need not infer from these occurrences that we are "on the eve of revolution" or any such thing. We are as orderly as ever as a people, and the riots of last week, instead of inclining us to revolutionary doctrines or practices have doubtless sent over to the Conservative side many waverers as well as many moderate Liberals among the tradesmen class. The riots at Leicester originated in a strike, and simply meant window-breaking. Leicester is in many respects a singular place, being largely radical and violently afflicted with the anti-vaccination and other unwholesome crazes. As I write telegrams come in announcing disturbances at Birmingham and Great Yarmouth, but nothing serious is anticipated at either place. These subsidiary "rows" are no doubt partly owing to the fact that the authorities have made no arrests for the London riots; consequently, the roughs elsewhere imagine that they may also do as they please. They are more or less encouraged in that direction by the fact that a Radical Government is now in power—a Government which counts among its members an under-secretary of the caliber of Mr. Henry Broadhurst, and gentlemen who have made prominent their doctrines of "ransom" and the idea that violence must precede reforms. No doubt the actual and severe distress among the operatives of some of our larger centers of population may predispose numbers of men to violence and rash actions. Still, I do not believe that in a single instance the *bona fide* workingmen have taken any part in the lawlessness which has been manifested. One result of the publicity thus given to the fact of some men being out of work has been the raising of a relief fund by the Lord Mayor of London, which fund has reached about £30,000 in three or four days, and is still growing. In other places funds are also being contributed, while various works of public utility and convenience are being promoted or pushed on with in order to give the men employment.

GERMAN COMPETITION.

If you read the English papers received just prior to the arrival of this, and concurrently with its advent, you may possibly come to the conclusion that our manufacturers have suddenly found out something about German competition which they did not know before. You will find all the papers full of reports, meetings, correspondence, &c., on the subject of German competition, the way it is eating the life out of British trade, and many suggestions to the best way of meeting it. Even our sober friend, the *Ironmonger*, devotes a good deal of space to the matter, and does so, I think, with good effect in the case of the meeting held at Wolverhampton. The paper read thereat by Mr. W. W. Walker, a well-known merchant, was particularly instructive as showing that, while our exports have decreased or moved but slightly, Germany has forged ahead rapidly. Further, he showed most conclusively that, although we have been feeling bad trade and small exports, the imports of the neutral countries have increased all along the line; consequently, the inference is that they have been gradually buying more and more from the Germans. Then again Sheffield and Birmingham are worried about the swords and bayonets. The swords are being procured from Solinger because the English makers (with one exception) either will not or cannot make them. The Germans both can and will; consequently, Solingen has the work, while Birmingham grumbles and does nothing. At Sheffield the local papers—especially one of them—seem to have taken leave of their senses. One of them talks about "the treason of Sheffield traders," and discourses by the column about the iniquity of buying goods from Germany and sending them out afresh with the mark "Sheffield," or labeled so as to give buyers the impression that the articles were really made at Sheffield. That journal threatens to expose the whole thing, and invites workmen to expose the "hidden secrets" of their employers' warehouses, grinding-wheels, &c., so to lay bare the iniquity. This may seem heroic to some; to me it looks more like hysterics. The other local paper has a remedy at hand in the shape of the imposition of an import duty of 10 per cent. on all articles of cutlery, tools, &c., not merely, it urges, for the sake of the duty, but because the custom-house officers would then rummage and examine everything so thoroughly as to stop anything coming into the country branded Sheffield or with the names of British firms. You will see with me that this is impracticable, and the idea could not be adopted unless and until we are prepared to abandon free trade and go for protection in a wholesouled and hearty manner. That we are not likely to do at present, so that Sheffield and other places must do more by less heroic methods to preserve and extend their businesses and reputation. As to German competition, in reality there is nothing new. It has always been lively, and the Germans doubtless now make a good many things very well indeed. They were steel makers and cutlers long before Sheffield took up those trades, and they have certainly been more plodding, more sensible, more scientific and more pushing than our own manufacturers. They have their reward, and until we can beat them with their own weapons they will remain ahead of Johnny Bull—always with exceptions, as a matter of course.

THE IRON MARKET

has shown no improvement during the week. At one time it seemed as though a considerable rally from last week's price was to be experienced at Glasgow, but, although 37/4 on February 9, the closing price was 39/0½ ₱ ton. As the severity of the weather has continued, shipments have again been small, and stocks have accordingly increased. Such conditions, while in a measure anticipated, are drawing the attention of producers to the imperative necessity of taking some steps of a radical nature to keep stocks down, yet so far the subject has only been discussed and left over to another day. At Middlesboro' no better state of affairs can be chronicled, there being absolutely no change worthy of notice from last week, and for prompt delivery of No. 3 foundry pig 30/9 has been accepted. No definite or combined action has been taken to restrict the output, but in some individual cases it is reported that reduction has been decreed, though necessarily but to a small degree. At Barrow and in West Cumberland the position remains unaltered, with mixed lots at from 43/6 to 44/ ₱ ton. A hopeful feeling pervades the district, although a very marked improvement is not immediately expected by those who are best able to judge of the prospects. In Staffordshire business has been dull and entirely without feature, and sales have only been effected in small parcels, and for more or less prompt delivery. In the Swedish pig market the absolute stagnation is unrelieved. In wire and wire fencing the effects of the keen German competition are too much felt to admit of any improvement under present conditions, while in the galvanized trade the demand continues dull and business is flat. Up to now nothing has been decided as to the proposed combination, and the general feeling is that nothing will come of the suggestion. The finished-iron departments have experienced but little, if any, change, for, although a few of the specifications for orders booked some little time back have been delivered, makers are not at all satisfied with the condition of their order-books, especially as many of the orders are reaching completion, and so far there is nothing of importance to go on with. The strikes and threatened strikes on the one hand, and the insistance of masters upon the reduction of wages, of which notice has been given, together with the disturbed condition of political affairs, have all tended to unsettle the market. Moreover, in Staffordshire rumors are freely circulated as to the pecuniary status of one or two houses in the finished-iron trade. In Cleveland common bars have changed hands at 92/6, angles 85/ @ 87/6, and ship plates at 90/, less commission. At Wolverhampton bars, common sorts, are 97/6, and single sheets at 130/. Old materials are unchanged, but steady. Freights have continued steady during the weak, 7/6 @ 10/ for pig iron from Glasgow to New York being still maintained. Steel has been without feature, and demand has been generally quiet and dull. Nothing of importance has been done in steel sleepers, but the desirability of adopting them for home railways is being seriously considered, and makers are somewhat eagerly anticipating an affirmative decision, and one which will enable them to become more busily engaged in the new department. The Steel Co. of Scotland have taken an order for the steel of a new bridge to be built over the Lachine River, just above Montreal, and for which some 3000 tons will be required. The bridge is to be erected in Canada by a Canadian firm of contractors. Steel rails have been in fairly good demand during the week, and some of the inquiries will, it is believed, lead to business. Among them may be mentioned about 12,000 tons for the East India Railway Co., 2600 tons for the Indian State Railway Co., 3500 tons for an Irish railway, and about 16,000 tons for Canada, presumably for some of the new branches of the Canadian Pacific Railway Co., all of which, if placed, will, it is hoped, be given to English makers—going, of course, through the combination. The meeting of the association held at Brussels last week was not productive of any decision as to the future, owing, it is said, to German persistency, and a postponement was therefore made until March.

HEMATITE PIGS

remain fairly steady, but quiet, at about 43/ @ 44/ for mixed lots in usual proportions, while West Coast makers' brands are:

	No. 1.	No. 2.	No. 3
Cleator	45/6	45/	44/6
Lonsdale	45/	44/6	44/
West Cumberland	44/	43/6	43/
Lowther	44/6	44/	43/6
Distington	44/	43/6	43/
Harrington	45/	44/	43/6
Solway	44/	43/6	43/
Maryport	44/	43/6	43/

West Coast shipments of hematite pig iron this year to date have increased by 11,367 tons, while the rail shipments have decreased by 4886 tons. Stocks in store only are 101,254 tons.

JANUARY EXPORTS TO THE UNITED STATES.

In giving you last week the Board of Trade returns I omitted the following table of exports during January to the United States:

Articles.	Month of Jan., 1886.	Month of Jan., 1885.	Month of Dec., 1885.
Alkali, cwt.	326,922	212,787	254,703
Hardware and cutlery, £	24,618	29,892	26,018
Iron—Pig, tons	24,829	7,195	33,703
Bar, angle, rod, &c., tons	255	177	1,685
Railroad, all, tons	.....	216	308
Hoops, sheets, plates, &c., tons	611	846	906
Tin plates, tons	17,637	15,726	16,551
Cast or wrought, tons	96	159	179
Old, tons	3,271	856	3,887
Steel, unwrought, tons	1,797	1,125	2,078
Lead, all sorts, tons	228	50	1
Steam engines, £	7,861	2,738	1,172
Other machinery, &c., £	19,549	17,879	30,054
Tin, unwrought, cwt	476	30	477
Special return—Steel rails, tons	.....	166	302

Current Hardware Prices, March 3, 1886.

HARDWARE.

Ammunition.
Caps, Percussion, ⅌ 1000—
Hicks & Goldmark's
F. L. Waterproof, 1-10's .... 50¢
E. B. Trimmed Edge, 1-10's .... 65¢
E. B. Ground Edge, Central Fire, 1-10's .... 70¢
Double Waterproof, 1-10's .... $1.40 } dis 25@25&5 %
Musket Waterproof, 1-10's .... 50¢
G. D. .... 28¢
S. B. .... 30¢
Union Metallic Cartridge Co.
F. C. Trimmed .... 50¢
F. L. Ground .... 65¢
Cen. Fire Ground .... 70¢
Double Waterproof $1.40
Double Waterproof, in 1-10's .... $1.40 } dis 25@25&5 %
S. B. Genuine Imported .... 45¢
Eley's E. B. .... 56¢
Eley's D Waterproof, Central Fire $1.60
Cartridges—
Rim Fire Cartridges .... dis 60&2 %
Rim Fire Military Cartridges .... dis 15&2 %
Cen. Fire Cartridges, Pistol and Rifle .... dis 40&2 %
Cen. Fire Cartridges, Military & Sporting .. dis 30&2 %
Blank Cartridges, except 22 and 32 cal., an additional 10 % over above discounts.
Blank Cartridges, 22 cal .... $1.50, dis 2 %
Blank Cartridges, 32 cal .... $3, dis 2 %
Primed Shells and Bullets .... dis 25&2 %
B. B. Caps, Round Ball .... $1.60, dis 2 %
B. B. Caps, Conical Ball, Swaged .... $1.75, dis 2 %
Primers—
Berdan Primers, all sizes, and B. L. Caps (for Sturtevant Shells) .... 90¢, dis 2 %
All other Primers, all sizes .... $1.10, dis 2 %
Shell—
Paper Shot Shells, 1st & 2d or S. G. qual. dis 25&5&2 %
Sebold's Combination Shot Shells .... dis 25&10&2 %
Paper Shot Shells, Club, Rival, Climax . dis 40&5&2 %
Paper Shot Shells, Star Brand .... dis 50&5&2 %
Brass Shot Shells, 1st quality .... dis 60&2 %
Brass Shot Shells, Club, Rival & Climax ... dis 65&2 %
Wads—
U. M. C. & W. R. A.—B. E., 11 up $2.00
U. M. C. & W. R. A.—B. E., 9&10 .... 2.30
U. M. C. & W. R. A.—B. E., 7&8 .... 2.60
U. M. C. & W. R. A.—P. E., 11 up 3.10
U. M. C. & W. R. A.—P. E., 9&10 .... 4.00
U. M. C. & W. R. A.—P. E., 7&8 .... 490 } dis 20&2 %
Eley's B. E., 11 up $1.75
Eley's P. E., 11 @ 20 .... $2.80

Anvils.
Eagle Anvils .... ⅌ ℔ 10¢—dis 20 %
Wright's .... 9¾ @ 10¢
Armitage's Mouse Hole .... 9¢
Armitage Mouse Hole, Extra .... 11¼¢
Trenton .... 9¼¢
Wilkinson's .... 9¼¢@10¢
J. & Riley Carr. Patent Solid .... 11@11½¢
Anvil Vise and Drill—
Millers Falls Co., $18.00 .... dis 20 %
Cheney Anvil and Vise .... dis 25 %
Allen Combined Anvil and Vise, $2.50 .... dis 40 %
Richardson's Vise and Anvil .... dis 25 %

Apple Parers.
Advance .... ⅌ doz $4.50
Champion .... ⅌ doz $7.50
Empire State .... each $9.00
Eureka .... each $12.00
Family Bay State .... ⅌ doz $12.00
Gem .... ⅌ doz $5.00
Improved Bay State .... ⅌ doz $28.00
Improved Penn, 1884 .... ⅌ doz $5.50
Jersey .... ⅌ doz $5.00
Little Star .... ⅌ doz $5.00
Model .... ⅌ doz $4.25
New Lightning .... ⅌ doz $6.50
Rocking Table .... ⅌ doz $6.50
Triumph, 1883 .... ⅌ doz $6.00
Turntable .... ⅌ doz $5.00
Two-Knife .... ⅌ doz $6.50
Waverly .... ⅌ doz $4.50
White Mountain .... ⅌ doz $4.75
Whittemore's Perfection .... ⅌ doz $6.00
Whittemore's Simplicity .... ⅌ doz $6.00
"72" .... ⅌ doz $4.25
"76" .... ⅌ doz $5.50
"78" .... ⅌ doz $6.50

Augers and Bits.
Douglass Mfg. Co.
New Haven Copper Co.
Wm. A. Ives & Co.
Humphreysville Mfg. Co.
French, Swift & Co. } dis 60&10&5 @ 70 %
Snell's .... dis 60@60&5 %
Cook's, Douglass Mfg. Co .... dis 55 %
Cook's, New Haven Copper Co ... dis 50&10@50&10&5 %
Ives' Circular Lip .... dis 60 %
Patent Solid Head .... dis 30 %
C. E. Jennings & Co., No. 10, extension lip .... dis 40 %
C. E. Jennings & Co., No. 30 .... dis 60 %
C. E. Jennings & Co., Auger Bits, in fancy boxes, ⅌ set, 32¼ quarters, No 5, $5; No. 30, $8 .... dis 20 %
Lewis' Patent Single Twist .... dis 45 %
Russell Jennings' Augers and Bits .... dis 25 %
Imitation Jennings' Bits (new list) . dis 50&10@50&10&5 %
Car Bits, Snell Mfg. Co .... dis 40&10&10 %
Car Bits, New Haven Copper Co .... dis 50&10 %
L'Hommedieu Car Bits .... dis 15 @ 20 %
Snell Mfg. Co.'s Jennings' Bits (new list) .... dis 50&5 %
Expansive Bits—
Clark's small, $18; large, $26 .... dis 35 @ 35&5 %
Ives' No. 4, per doz., $60 .... dis 35 @ 40 %
Swan's .... dis 40 %
Ansonia .... dis 25 %
Steer's, No. 1, $26; No. 2, $22 .... dis 35 %
Hollow Augers—
Ives'
French, Swift & Co.
Douglass' } dis 25&10 %
Bonney's Adjustable ⅌ doz. $48 .... dis 40&10 %
Stearns' Adjustable ⅌ doz. $48 .... dis 20&10 %
Ives' Expansive, each $4.50 .... dis 45 @ 50 %
Universal Expansive, each $4.50 .... dis 20 %
Wood's .... dis 25 @ 25&10 %
Gimlet Bits—
Common .... ⅌ gross $3.00 @ $3.25
Diamond .... ⅌ doz. $1.10, dis 25&10 %
"Bee" .... dis 25 %
Double Cut, Shepardson's .... dis 45 %
Double Cut, Ct. Valley Mfg. Co .... dis 30&10 %
Double Cut, Hartwell's, ⅌ gro, $6.50 .... dis 10 %
Double Cut, Douglass' .... dis 40 %
Double Cut, Ives' .... dis 50&10@50&10&5 %
Drill Bits—
Syracuse Twist .... dis 30 @ 30&5 %
Holt's Bit Stock Drills .... dis 25&10 %
Ship Augers and Bits—
L'Hommedieu's .... dis 15 @ 20 %
Watrous's .... dis 15 @ 20 %
Snell's .... dis 15 @ 20 %
Snell's Ship Auger Pattern Car Bits .... dis 15 @ 20 %

Awl Hafts.
Sewing, Brass Ferrule .... $3.50 ⅌ gross—dis 40&10 %
Patent Sewing, Short .... $1.00 ⅌ doz—dis 40&10 %
Patent Sewing, Long .... $1.20 ⅌ doz.—net
Patent Peg, Plain Top .... $10.00 ⅌ gross—dis 45&10 %
Patent Peg, Leather Top .... $12.00 ⅌ gross—dis 45&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common .... ⅌ gross $1.70—dis 35 %
Awls, Shouldered Peg .... ⅌ gross $2.45—dis 40@40&10 %
Awls, Patent Peg .... ⅌ gross 63¢—dis 40@40&10 %
Awls, Shouldered Brad .... $2.70 ⅌ gross—dis 35 %
Awls, Handled Brad .... $7.50 ⅌ gross—dis 45 %
Awls, Handled Scratch .... $7.50 ⅌ gross—dis 35&10 %
Awls, Socket Scratch .... $1.50 ⅌ doz—dis 25 @ 30 %

Awls and Tools.
Aiken's Sets, Awls & Tools ... ⅌ doz. $10.00—dis 50&10 %
Adj. Tool Handles, No. 1 ... ⅌ doz $12—dis 25 @ 25&10 %
Adj. Tool Handles, No. 2 ... ⅌ doz $18—dis 25 @ 25&10 %
Henry's Combination Haft .... ⅌ doz. $6
Brad Sets, No. 42, $10.50; No. 43, $12.50 ... dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $7.50.
Brad Sets, Stanley's Excelsior, No. 2, $4.00.
Brad Sets, Stanley's Excelsior, No. 3, $5.50. } dis 30&10 %

Axes.
Best according to brand .... ⅌ doz $6.50 @ $7.00
Special brands .... $5.50 @ $6.00

Axle Grease.
Frazer's, in bulk .... Keg ⅌ ℔, 5¢; Pail, ⅌ ℔, 6¢ net
Frazers, in boxes .... ⅌ gross $9.50 @ $9

Axles.
Nos. 1 to 6 .... 3¼¢; Short bed, 4¢
Nos. 7 to 18 .... dis 60&5@60&10 %
Nos. 19 to 22 .... dis 70&5@70&10 %
Nos. 23 to 26 .... dis 60&5@60&10 %
Tubular Wrought Steel (National Self-Oiling):
Less than 10 sets .... dis 33⅓ %
Over 10 sets .... dis 33⅓&5 %

Bag Holders.
Sprengle's Pat., ⅌ doz $18 .... dis 60 %

Balances.
Spring Balances .... dis 50 %
Common 24 ℔ .... ⅌ doz., $1.50—dis 50 %
Chatillon's Spring Balances .... dis 50 %
Chatillon's Circular Spring Balances .... dis 60 %

Bells.
Hand—
Light Brass .... dis 75&10 %
Extra Heavy .... dis 65&10 @ 70 %
White Metal .... dis 70 @ 70&5 %
Silver Chime .... dis 25&10&5 %
Globe (Cone's Patent) .... dis 25&10 %
Door—
Gong, Abbe's .... dis 25&10 %
Gong, Yankee .... dis 40&10 %
Gong, Barton's .... dis 40&10 %
Crank, Taylor's .... dis 25&10 %
Crank, Brooks' .... dis 50&10&2 %
Crank, Cone's .... dis 10 %
Crank, Connel's .... dis 20&10 %
Lever, Sargent's .... dis 60&10 %
Lever, Taylor's Bronzed or Plated .... net
Lever, Taylor's Japanned .... dis 25&10 %
Lever, R. E. M. Co.'s .... dis 50&10&2 %
Pull, Brook's .... dis 50&10&2 %
Pull, Western .... dis 25&10 %
Cow—
Common Wrought .... dis 60&10 %
Western .... dis 20&10 %
Western, Sargent's list .... dis 70&10 %
Kentucky "Star" .... dis 20&10 %
Kentucky, Sargent's list .... dis 70&10 %
Dodge, Genuine Kentucky, new list .... dis 70 %

Nos.	0	1	1½	2	3	4	5	6	7	Hog
	$12.00	10.00	9.00	8.00	6 00	5.00	4.00	3.00	2.50	5.00

Texas Star .... dis 50&10 @ 50&10&5 %
Call .... dis 40@40&5 %
Farm Bells .... ⅌ ℔, 2¾ @ 3¢
Steel Alloy Church and School Bells .... dis 40 %

Bellows.
Blacksmiths' .... dis 50&10@50&10&5 %
Molders' .... dis 50@50&5 %
Hand Bellows .... dis 50@50&5 %

Belting, Rubber.
Standard .... dis 70&5 %
Extra .... dis 60@60&10 %
N. Y. B. & P. Co., Standard .... dis 60 %
N.Y.B.&P.Co., Ex. Standard .. dis 50&10 %
Cleveland Rubber Co., Extra Standard .... dis 60&10 % } dis 5 % cash.

Bench Stops.
Hotchkiss's .... ⅌ doz $5.00—dis 10 @ 10&10 %
Weston's, per doz No. 1, $10; No. 2, $9 .. dis 25&10&5 %
McGill's .... ⅌ doz $3—dis 10 %
Morrill's .... ⅌ doz $9—dis 50 %

Bit Holders.
Extension, Barber's .... ⅌ doz $15.00—dis 40&5 %
Extension, Ives' .. ⅌ doz $20.00—dis 40&10 @ 40&10&5 %
Diagonal .... ⅌ doz $24.00—dis 40 %
Angular .... ⅌ doz $24.00—dis 40&5 %

Blind Adjusters.
Domestic .... ⅌ per doz $3.00—dis 30 %
Excelsior .... ⅌ doz $10.00—dis 50&10&2 %

Blind Fasteners.
Mackrell's .... ⅌ doz pairs, $1.00—dis 20@20&10 %
Van Sand's Screw Pattern .... $15 ⅌ gro.—dis 50&10 %
Van Sand's Old Pattern .... $15 ⅌ gro.—dis 50&10 %
Washburn's Old Pattern .... $9 ⅌ gro. net
Merriman's .... new list, net
Salisbury & Austin No. 2008 .... $9 ⅌ gro. net
Security Gravity .... $9 ⅌ gro. net

Blind Staples.
Barbed, ½ in. and larger .... ⅌ ℔ 8 @ 8½¢ net
Barbed, ⅜ in .... ⅌ ℔ 9 @ 9½¢ net

Blocks.
Tackle Blocks, &c. list April 17, 1885 .... dis 20 %
Steen Mfg. Co. Self-Lubricating .... dis 50 %

Bolts.
Door and Shutter—
Cast Iron Barrel, Square, &c .... dis 70 @ 70&5 %
Cast Iron Shutter Bolts .... dis 70 @ 70&5 %
Cast Iron Chain (Sargent's list) .... dis 65&10 %
Ives' Patent Door Bolts .... dis 55 %
Wrought Barrel .... dis 70 @ 70&5 %
Wrought Square .... dis 70 @ 70&5 %
Wr't Shutter, all Iron, Stanley's list .... dis 60&10 %
Wr't Shutter, Brass Knob, Stanley's .... dis 40&10 %
Wrought Shutter, Sargent's list .... dis 60&10 %
Wrought Sunk Flush, Sargent's list .... dis 55&10 %
Wrought Sunk Flush, Stanley's list .... dis 40&10&5 %
Wrought B.K. Flush, Com'n Stanley's list. dis 55&10 %
Carriage—
Com. list June 10, '84 .... dis 75&10&5 @ 80&5 %
Genuine Eagle, list Oct., '84 .... dis 75 @ 75&5 %
Phila. pattern, list Oct. 7, '84 ... dis 75&10@75&10&5 %
R. B. & W., old list .... dis 70&5 %
Tire—
Common, list Feb. 28, 1883 .... dis 65&10 %
Am. S. Co., Norway, Ph'l., list Oct. 16, '84 .... dis 80 %
Am. S. Co., Eagle, Phil., list Oct. 16, '84 .... dis 82½ %
Am. S. Co., Philadel. list, Oct. 16, '84 .... dis 82½&5 %
Am. S. Co., Bay State, list Feb. 28, '83 .... dis 65&10 %
R. B. & W., Philadel. list Oct. 16, 1884 .... dis 80&5 %
R. & E. Mfg. Co .... dis 65&10 %
Stove and Plow—
Stove .... dis 70 %
Plow .... dis 65 %
Am. S. Co. Stove, Annealed .... dis 70 %
R. B. & W., Plow .... dis 50&5 %
R. B. & W., Stove .... dis 70&5 %
Machine .... dis 75&10&5 @ 80 %
Bolt Ends .... dis 75&10&5 @ 80 %

Borax .... ⅌ ℔ 8½¢ @ 9¢

Boring Machines.

Without Augers.	Upright.	Angular.
Douglas	$5.50	$6.75 .... dis 50 %
Snell's, Rice's Patent	5.50	6.75. dis 40&10&10 %
Jennings	5.50	6.75. dis 45@45&10 %
Other Machines	2.50	3.00 .... net
Phillips' Pat., with Augers	7.00	7.50 .... net

Bow Pins.
Humason, Beckley & Co.'s, Nos 1 and 2— dis 60&10 @ 60&10&5 %
Humason, Beckley & Co.'s other Nos. dis 70 @ 70&10 %
Sargent & Co.'s .... $17 and $18, dis 60&10 %
Peck, Stow & W. Co .... dis 50&10 @ 50&10&5 %

Braces.
Q. S. Backus .... dis 50&10 @ 50&10&10 %
Barber's, Nos. 10 to 16 .... dis 50 %
Barber's, Nos. 30 to 33 .... dis 50 %
Barber's, Nos. 40 to 63 .... dis 50&10 %
Spofford's .... dis 50&10 %
Ives' Patent Braces .... dis 60@60&10 %
Common Ball, American .... dis 55&10 %
Bartholomew's, Nos. 25, 27, 30 .. dis 50&10@50&10&10 %
Bartholomew's, Nos. 117, 118, 119 .... dis 65 @ 65&5 %
Amidon's Barker's Imp'd .... dis 60@60&10&5 %
Amidon's Corner Brace .... dis 40 @ 40&10 %
Universal .... 8 in., $1.90; 10 in., $2.10
Buffalo Ball .... 8 in., $1.50 @ $1.55

Brackets.
Shelf, plain, Sargent's list .... dis 55&10 %
Shelf, fancy, Sargent's list .... dis 60&10 %
Reading, plain .... dis 60&10 %
Reading, Rosette .... dis 65&10 %

Bright Wire Goods.
Regular list .... dis 75&10 @ 80 %

Broilers.
Henis' Self-Basting .. { Inch .... 9 10 9 x 11 / Per doz .... $4.50 5.50 6.50 }

Buckets.—See Well Buckets and Pails.

Bull Rings.
Union Nut Co .... dis 55 %
Sargent's .... dis 66⅔&10 %
Hotchkiss' low list .... dis 30 %
Humason, Beckley & Co.'s .... dis 70&10 %
Peck, Stow & W. Co.'s .... dis 50&10 %
Ellrich Hdw. Co., White Metal, low list .... dis 50 %

Butts.
Brass—
Wrought Brass .... dis 75&10 %
Cast Brass, Tiebout's .... dis 40 %
Cast Brass, Corbin's F. Joint .... dis 33⅓&10@33⅓&10&10 %
Cast Brass, Loose Joint .... dis 33⅓&10@33⅓&10&10 %
Cast Iron—
Fast Joint, Narrow .... dis 60&5 @ 60&10&5 %
Fast Joint, Broad .... dis 60&5 @ 60&10&5 %
Loose Joint
Loose Joint, Japanned
Loose Joint, Jap. with Acorns
Parliament Butts
Mayer's Hinges
Loose Pin, Acorns
Loose Pin, Acorns, Japanned
Loose Pin, Acorns, Jap. Pltd. Tips } dis 70&10 @ 70&10&5 %
Wrought Iron—
Fast Joint Narrow .... dis 60&10&10&2@70 %
Fast Joint, Lt. Narrow .... dis 60&10&10&@70 %
Fast Joint, Broad .... dis 60&10&10&2@70 %
Loose Joint, Broad .... dis 60&10&10&5&2@70&5 %
Table Butts, Back Flaps, &c .... dis 60&10&10&2@70 %
Inside Blind, Regular .... dis 60&10&10&2@70 %
Inside Blind, Light .... dis 60&10&10&2@70 %
Loose Pin, Wrt .... dis 60&10&10&5&2@70&5 %
Loose Pin, Light .... dis 60&10&10&2@70 %
Bronzed Wrought Butts .... dis 40&5@40&10& 5 %
Blind Butts—
Parker .... dis 75&2 %
Palmer .... dis 50&5&10 %
Seymour .... dis 70&2 %
Lull & Porter .... dis 80&10 %
Nicholson .... dis 45&10 %
Huffer .... dis 50 %
Clark's, Nos. 1, 3, 5 .... dis 80&5 @ 80&10 %
Sargent's, Nos. 1, 3, 5, 11, 13 .... dis 75&10 %
Sargent's, No. 12 .... dis 75&10&10 %
Reading's Gravity .... dis 75&10 %
Shepard's "Noiseless" Nos. 50, 60, 65, 45 and 55 .... dis 75&10 @ 80 %
Shepard's Champion Gravity, No. 75 .... dis 80&5&5 %
Shepard's "Gravity." Nos. 1, 3 and 5 .... dis 80 %
Shepard's Steamboat Gravity, No 10. dis 80&10&2½ %
Shepard's "O. S." and "Acme" Lull & Porter .... dis 75&10&5 %
Shepard's "Queen City" Reversible .... dis 75&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3 .... dis 70 %
North's Automatic Blind Fixtures, No. 2, for Wood, $9; No. 3, for Brick, $10.50.

Butcher's Cleavers.
Humason & Beckley Mfg. Co .... dis 30&5 @ 30&10 %
Bradley's .... dis 25 @ 30 %
Beatty's .... dis 33⅓&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

New Haven Edge Tool Co.'s .... dis 40 %
Albertson Mfg. Co .... dis 33⅓ @ 33⅓&5 %

Calipers.—See Compasses.

Can Openers.
Messenger's Comet .... ⅌ doz $3.00, dis 25 %
American .... ⅌ gross $3.00
Duplex .... ⅌ doz 25¢, dis 15 @ 20 %
Lyman's .... ⅌ doz $3.75, dis 20 %
No. 4, French .... ⅌ doz $2.25, dis 55 @ 60 %
No. 5, Iron handle .... ⅌ gross $6.00, dis 45 @ 50 %
Eureka .... ⅌ doz $2.50, dis 10 %
Sardine Scissors .... ⅌ doz $7.00, dis 55 %
Star .... ⅌ doz $5.00, dis 25&5 %
Sprague, No. 1, $2; 2, $2.25; 3, $2.50 .... dis 60@60&10 %
World's Best, ⅌ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00 .... dis 50&10 %
Universal .... ⅌ doz $3.00, dis 35&5 %
Domestic .... ⅌ doz $2.50, dis 45 %
Champion .... ⅌ doz $2.00, dis 50 %

Cards.
Horse and Curry .... dis 10 @ 10&10 %
Cotton .... New list, Aug., 1883, dis 10 %
Wool .... " " " dis 10 %

Carpet Stretchers.
Cast Steel, Polished .... ⅌ doz $3.25
Cast Iron, Steel Points .... ⅌ doz 80¢
Socket .... ⅌ doz $1.75
Bullard's .... dis 25 @ 25&10 %

Carpet Sweepers.
Bissell No. 5 .... ⅌ doz $17.00
Bissell No. 7 New Drop Pan .... ⅌ doz $19.00
Bissell No. 12 Hall Sweeper .... ⅌ doz $36.00
Grand Rapids .... ⅌ doz $24.00
Crown Jewel .... No. 1, $18; No. 2, $19; No. 3, $20
Magic .... ⅌ doz $15.00
Jewel .... ⅌ doz $17.00
Mystic .... ⅌ doz $17.00
Cottage .... ⅌ doz $15.00
Garland .... ⅌ doz $19.00
Queen .... ⅌ doz $16.00
Queen, with band .... ⅌ doz $18.00
King .... ⅌ doz $30.00

Cartridges.—See Ammunition.

Casters.
Bed
Plate
Shallow Socket } dis 60 @ 60&5 %
Deep Socket .... dis 45 @ 50 %
Yale Casters, reduced list May, 1884. dis 25@25&10&5 %
Martin's Patent (Phoenix) .... dis 45&10 @ 50 %
Payson's Anti friction .... dis 60 %
"Giant" Truck Casters .... dis 10 @ 10&5 %
Stationary Truck Casters .... dis 45&10

Cattle Leaders.
Humason, Beckley & Co.'s .... dis 75 %
Sargent's .... dis 66⅔&10 %
Hotchkiss .... dis 30 %
Peck, Stow & W. Co .... dis 50&10 %

Chain.
Trace, 6½-10-2, Eng. sizes .... ⅌ pair 79¢
Trace, 6½-10-3, Eng. sizes .... ⅌ pair 70¢
Trace, 7-10-2, Eng. sizes .... ⅌ pair 86¢ } dis 50&10 @ 50&10&5 %
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884 .... dis 50&10 @ 50&10&5 %

American Coil	3-16	¼	5-16	⅜	7-16	½
In cask lots	$7.75	5.25	4.50	3.75	3.50	3.40

American Coil, less than cask lots, add ¼¢ ⅌ ℔.
German Coil, list of June, 1881 .... dis 55&5@60 %
German Halter Chain, list of June, 1884. dis 55&5@60 %
Covert Halter, Hitching and Breast .... dis 50&2 %
Covert Traces .... dis 40&2 %
Meneely's Breast, Halter and Hitching .... dis 50&10 %
Meneely's Pat. Sleeve-Snap Breast .... dis 50&10
Oneida Halter Chain (old list) .... dis 45 %
Galvanized Pump Chain .... ⅌ ℔ 5½¢ @ 6¢
Jack Chain, Iron .... dis 70&10 @ 70&10&5 %
Jack Chain, Brass .... dis 70&10 @ 70&10&5 %

Chalk.
White .... ⅌ gro 55¢
Red .... ⅌ gro 75¢
Blue .... ⅌ gro 90¢
White Crayons .... ⅌ gro 12¢ @ 12½¢

Chalk Lines.—See Lines.

Chisels.
Socket Framing and Firmer .... dis 75&10&5 @ 80 %
Douglass & Witherby .... dis 75 @ 75&10 %
Socket Framing and Firmer, Buck Bros .... dis 30 %
Socket Framing and Firmer, Merrill .... dis 60&10&10 %
Socket Firmer, Framing, &c., L. & I. J. White. dis 25&5 %
Socket Framing Firmer &c., Crossman .... dis 65&5 %
Tanged Firmers .... dis 50 @ 50&5 %
Tanged Firmers, Butcher's .... $4.75 @ $5.00
Tanged Firmers, Spear & Jackson's .... $5.00 to £
Tanged Firmers, Buck Bros .... dis 30 %

Clamps.
Providence Tool Co.'s Wrought Iron .... dis 25 %
Adjustable, Gray's .... dis 20 %
Adjustable, Lambert's .... dis 20 %
Adjustable, Snow's .... dis 40&5 %
Adjustable, Hammer's .... dis 15 %
Adjustable, Stearns' .... dis 20&10 %
Cabinet, Sargent's .... dis 66⅔&10 %
Carriage Makers', Sargent's .... dis 66⅔&10 %
Eberhard Mfg. Co .... dis 40&5 @ 40&10 %
Warner's .... dis 40&10 %
Saw Clamps .... See Vises

Clips.
Axle and Spring Bar, Norway Iron .... dis 65&2 %
Wrought-Iron Felloe Clips .... ⅌ ℔ 5½¢
Steel Felloe Clips .... ⅌ ℔ 5¢

Coal Hods.
Sidney Shepard & Co.'s list .... dis 45 @ 45&10 %
Iron Clad Mfg. Co.'s and Central Stamping Co.'s } list .... dis 70 @ 70&5 %
Whiting & Co., Japanned .... dis 70 %
Whiting & Co., Galvanized .... dis 70&5 %

Coal Vases.
Buffalo Palace, S. S. & Co .... dis 33⅓&10&10 %
Buffalo Common, S. S. & Co .... dis 33⅓&10&10 %

Cockeyes .... dis 50 %

Cocks, Brass.
Racking .... dis 65&10 @ 70 %
Globe .... dis 65&10 @ 70 %
Plain Bibbs .... dis 60&10 @ 60&10&5 %
Ale and Beer .... dis 60&10 @ 60&10&5 %

Coffee Mills.
Board and Box .... dis 40&10&2 @ 45&10&2 %
Selsor's Patent .... $9.50, $10.50, dis 25 %
American, Enterprise Mfg. Co .... dis 20&10@30 %
The "Swift," Lane Bros .... dis 20&10 %
Webb's Patent .... dis 45 %

Compasses, Dividers, &c.
Compasses .... dis 60&10&10@70 %
Calipers .... dis 60&10&10@70 %
Dividers .... dis 60&10&10@70 %
Bemis & Call Co.'s Dividers .... dis 60&5 %
Bemis & Call Co.'s Compasses & Calipers .... dis 50&5 %
Bemis & Call Co.'s Wing & Inside or Outside. dis 50&5 %
Bemis & Call Co.'s Double .... dis 60 %
Bemis & Call Co.'s (Call's Patent Inside) .... dis 30 %
Excelsior .... dis 50 %
Cook's Extension .... dis 25 @ 25&5 %
J. Stevens & Co.'s Calipers and Dividers .... dis 25&10 %

Coopers' Tools.
Bradley's .... dis 20 %
Barton's .... dis 20@20&5 %
L. & I. J. White .... dis 20&5 %
Albertson Mfg. Co .... dis 25 %
John Beatty & Co .... dis 33⅓ %

Corkscrews.
Humason & Beckley Mfg. Co .... dis 40 %
Clough's Patent .... dis 33⅓ @ 33⅓&5 %
Howe Pros. & Hulbert .... dis 35 %

Corn Knives and Cutters.
Bradley's .... dis 10 %
Wadsworth's .... dis 25 %

Cradles.
Grain .... dis 40&5&2 %

Crow Bars.
Cast Steel .... ⅌ ℔ 3¾¢
Iron, Steel Points .... ⅌ ℔ 3¼¢

Curry Combs.
Fitch's .... dis 50&10 @ 50&10&5 %
Rubber .... ⅌ doz $10.00, dis 25 @ 30 %

Curtain Pins.
Silvered Glass .... net
White Enamel .... net

Cutlery.
Beaver Falls and Booth's .... dis 33⅓ %
Goodell Co., Table .... dis 35 @ 40 %
Wostenholme .... $7.75 @ $8.00 to £

Dividers—See Compasses.

Dog Collars.
Embossed Gilt, Pope & Stevens' list .... dis 30&10 %
Leather, Pope & Stevens' list .... dis 40 %
Brass, Pope & Stevens' list .... dis 40 %

Door Springs.
Torrey's Rod, regular size .... ⅌ doz $1.45 @ $1.50
Gray's .... ⅌ gro, $20.00, dis 20 %
Bee Rod .... ⅌ gro, $20.00, dis 20 %
Warner's No. 1, ⅌ doz, $2.50; No. 2, $3.30 .... dis 40&10 %
Gem (Coil):
No. 1, Large Japanned .... ⅌ doz $4.00
No. 2, Medium, Japanned .... ⅌ doz 2.75
No. 3, Small, Japanned .... ⅌ doz 2.00 } dis 50&10 %
Star (Coil)—List:
No. 4, ("Shoo Fly") Screen Door size .... ⅌ doz $1.50
No. 5, Screen Door size .... ⅌ doz 2.00
No. 6, Medium .... ⅌ doz 2.75
No. 7, Large .... ⅌ doz 4.00
Japanned and Coppered .... dis 65 %
Galvanized and Nickel-Plated .... dis 50 %
Victor (Coil) .... dis 60 @ 60&10 %
Champion (Coil) .... dis 60&10 @ 60&10&10 %
Philadelphia .... 5 in., $5.00; 8 in., $7.75, dis 30 %
Cowell's .... No. 1, ⅌ doz $18.00; No. 2, $15.00, dis 50 %
Rubber, complete .... ⅌ doz $4.50, dis 55&10 %
Hercules .... dis 50 %
Shaw Door Check and Spring .... dis 25 @ 30 @ 35 %
Elliott's Door Check and Spring .... dis 25 %

Drawing Knives .... dis 75&10&5 @ 80 %
Douglass & Witherby .... dis 75 @ 75&10 %
Merrill .... dis 60&10&10 %
Watrous .... dis 15&10 @ 25 %
L. & I. J. White .... dis 20&5 %
Bradley's .... dis 35 %
Adjustable Handle .... dis 20 @ 25 %

Drills and Drill Stocks.
Blacksmiths' .... each, $1.60 @ $1.70
Blacksmiths' Self-Feeding .... each, $7.50, dis 20 %
Breast, P. S. & W .... dis 40&10 %
Breast, Wilson's .... dis 30&5 %
Breast, Millers Falls .... each, $3.00 dis 25 %
Breast, Bartholomew's .... each, $2.50, dis 25&10 @ 40 %
Ratchet, Merrill's .... dis 20 %
Ratchet, Ingersoll's .... dis 25 %
Ratchet, Parker's .... dis 20 @ 20&5 %
Ratchet, Whitney's .... dis 20&10 %
Ratchet, Weston's .... dis 20@25 %
Ratchet, Moore's Triple Action .... dis 25 @ 30 %
Whitney's Hand Drill, Plain, $11.00; Adjustable, $12.00 .... dis 20&10 %
Wilson's Drill Stocks .... dis 10 %
Automatic Boring Tools .... each, $1.75 @ $1.85

Drill Chucks.
Morse's Beach Patent .... each, $8.00, dis 20 %
Morse's Adjustable .... each, $7.00, dis 20 @ 20&5 %
Danbury .... each, $8.00, dis 30 @ 30&5 %

Dripping Pans.
Per ℔ .... 5¢ @ 5¼¢

Egg Beaters.
Dover .... ⅌ doz., $2.50
National .... ⅌ doz $4.50, dis 33⅓ %
Family (T. & S. Mfg. Co.) .... ⅌ gro, $17.00@$18.00
Standard .... ⅌ gro, $12.00
Kingston .... ⅌ gro, $9.00
Acme .... ⅌ gro, $8.00
Triumph (T. & S. Mfg. Co.) .... ⅌ gro, $10.50@$11.50
Advance No. 1 .... ⅌ gro $10.50
Advance, No. 2 .... ⅌ gro $10.00
Bryant's .... ⅌ doz $1.75
Ayres' Spiral .... ⅌ gro $5

Emery.
Regular numbers .... ⅌ ℔ 7¢
Flour and F. F .... ⅌ ℔ 6½¢
For Emery Paper and Cloth, see Sand Paper.

Enameled and Tinned Ware.—See Hollow-Ware.

Escutcheon Pins.
Iron and Brass, list Nov. 11, 1885 .... dis 50&5 %

Escutcheons.
Door Lock .... Same discounts as Door Locks
Brass Thread .... dis 60 @ 60&10 %
Wood .... dis 25 %

Faucets.
Fenn's .... dis 40 %
Bohren's Patent Rubber Ball .... dis 25 %
Fenn's Cork Stops .... dis 33⅓ %
Star .... dis 60 @ 60&5 %
Frary's Patent Petroleum .... dis 33⅓& 10 %
West's Patent Key .... dis 50 %
Anchor Lock .... dis 45 %
Metallic Key, Leather Lined .... dis 55&10 @ 60&10 %
Cork Lined .... dis 70 @ 70&10 %
J. Sommer's Best Block Tin Key .... dis 40 %
J. Sommer's Cork Lined, 1st quality .... dis 50 %
J. Sommer's Diamond Lock .... dis 40 %
Self-Measuring, Enterprise ... ⅌ doz $36.00—dis 20&10 %
Self-Measuring, Lane's .... ⅌ doz $36.00—dis 25&10 %
Self-Measuring, Victor .... ⅌ doz $36.00—dis 25&10 %

Felloe Plates .... ⅌ ℔ 6¼¢ net

Files.
Domestic—
Best brands, list Dec. 1, 1885 ... dis 55&10@55&10&5 %
Lower Grade, list Dec. 1, 1885 .... dis 70 %
J. B. Smith Co. Screw Tang .... dis 55@55&10 %
New Am. File Co., Pat. Tapers, special list ... dis 50 %
Heller's Horse Rasps .... dis 50&10 %
Imported—
J. & Riley Carr .... List, April 1, 1883, dis 15 %
J. & Riley Carr Horse Rasps .... dis 10 %
Moss & Gamble .... List April 1, 1883, dis 15 %
Butcher .... Butcher's list, dis 20 %
Stubs .... Stubs list, dis 25 @ 30 %

Fluting Machines.
Knox, 4½-inch Rolls .... $3.25 each
Knox, 6-inch Rolls .... $3.60 each } dis 35 %
Eagle, 3½-inch Roll .... $2.15, dis 35 %
Eagle, 5½-inch Roll .... 2.85, dis 35 %
Crown, 4½ in., $3.50; 6-in, $4.00; 8-in., $6.50 each, dis 35 %
Crown Jewel .... 6-in., $3.50 each, dis 35 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 35 %
Domestic Fluter .... $1.50 each, net
Geneva Hand Fluter, White Metal .. ⅌ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00, ⅌ doz .... dis 30 %
Shepard Hand Fluter, No. 85 .... ⅌ doz $15.30, dis 40 %
Shepard Hand Fluter, No. 110 .... ⅌ doz $11, dis 40 %
Shepard Hand Fluter, No. 95 .... ⅌ doz $8, dis 40 %
Clark's Hand Fluter .... ⅌ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron ... ⅌ doz $15.00, dis 30 %
Buffalo .... ⅌ doz $10.00 dis 10 %

Fluting Scissors .... dis 45 %

Forks.
Hay, Manure, &c., Asso. list .... dis 60&10&5 %
Hay, Manure, &c., Phila. list .... dis 60 @ 60&5 %
Plated, see Spoons.

Freezers.—See Ice-Cream Freezers.

Fruit and Jelly Presses.
Enterprise Mfg. Co .... dis 20&10 @ 33⅓ %

Fry Pans.
Central Stamping Co.'s list .... dis 33⅓&2 @ —%

No.	0	1	2	3	4	5	6	7	8
⅌ doz	$1.50	1.75	2.00	2.25	2.50	2.75	3.25	3.75	4.25

Sidney Shepard & Co .... dis 40&2 %
"Acme" .... dis 60 %
Iron Clad Mfg. Co.'s list .... dis 70 %

No.	0	1	2	3	4	5	6	7	8
⅌ doz	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

Gauges.
Marking .... dis 60&10 %
Wire .... dis 10&10 %
Wire, Wheeler, Madden & Co .... dis 10 %

Gimlets.
Nail and Spike .... dis 50&10&5 %
"Eureka" Gimlets .... dis 40&10 %
"Diamond" Gimlets .... dis 40&10 %
Double Cut, Shepardson's .... dis 45 %
Double Cut, Ives' .... dis 50 %
Double Cut, Douglass' .... dis 40 %
"Bee" .... ⅌ gross $12, dis 25 %

Glue Pots.
Tinned and Enameled .... dis 30@30&5 %
Family, Howe's "Eureka" .... dis 40 %
Family, L. F. & C.'s "Handy" .... dis 45 %

Grindstone Fixtures.
Sargent's Patent .... dis 70&10 %
Reading Hardware Co .... dis 33⅓&10 %

Hack Saws.—See Saws.

Halters.—Covert's Pat. ¼ Jute .... dis 50&10&2 %
Covert's Hemp Horse and Cattle Tie .... dis 50&10&2 %
Covert's Jute Horse and Cattle Ties .... dis 60&2 %
Meneely's Pat. Adjustable Hemp and Jute. dis 50&10 %
Meneely's Hemp and Jute Horse and Cattle Ties .... dis 50&10 %

Hammers.
Maydole's .... List Dec. 1, 1885, dis 25 @ 25&10 %
Cheney's, new list, March, 1883 .... dis 20&10 %
Hartford Hammer Co.'s Nail Ham's .. dis 25&5@25&10 %
Buffalo Hammer Co .... dis 30 @ 35 %
C. Hammond & Son .... dis 40&10 @ 50 %
Humason & Beckley .... dis 25 %
Verree .... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75. dis 25&10 %
Nelson Tool Works .... dis 40&10 %
Warner & Nobles .... dis 10 %
Yerkes & Plumb, A. E. Nail .... dis 40&10@40&10&5 %
Peck, Stow & Wilcox .... dis 40 %
Sargent's .... dis 33⅓&10 %
Wilkinson's Smiths' .... 10½¢ @ 11¢ ⅌ ℔
Heavy Hammers and Sledges .... dis 60&10 %

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ⅌ doz .. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ⅌ doz ... dis 10 %
Tower's .... dis 25 %
Daley's Improved Hand Cuffs: 2 Hands, Polished, ⅌ doz, $48; Nickeled, $57; 3 Hands, Polished, ⅌ doz, $72; Nickeled, $84 .... dis 20 %

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz.	$0.90	1.00	1.18	1.35	1.50	dis 60&10&10 %

Roggin's Latches .... ⅌ doz. 30¢ @ 35¢
Bronze Iron Drop Latches .... ⅌ doz. 70¢ net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 .... net
Barn Door .... ⅌ doz. $1.40, dis 10&10 %
Wrought Chest .... dis 70 %
Surface Chest .... dis 70 %
Flush Chest .... dis 70 %
Lifting .... dis 70 %
Handles, Wood—
Saw and Plane .... dis 40&10 %
Hammer, Hatchet, Axe, Sledge, &c .... dis 35@35&5 %
Brad Awl .... ⅌ gross $2.00
Hickory Firmer Chisel, assorted .... ⅌ gross 4.50
Hickory Firmer Chisel, large .... ⅌ gross 5.00
Apple Firmer Chisel, assorted .... ⅌ gross 5.00
Apple Firmer Chisel, large .... ⅌ gross 6.00
Socket Firmer Chisel, assorted .... ⅌ gross 3.00
Socket Framing Chisel, assorted .... ⅌ gross 5.00 } dis 40
J. B. Smith Co.'s Pat. File .... dis 50 %
File, assorted .... ⅌ gross 2.75
Auger, assorted .... ⅌ gross 5.00
Auger, large .... ⅌ gross 7.00 } dis 40 @ 40&10 %
Patent Auger, Ives' .... dis 25 %
Patent Auger, Douglass' .... ⅌ set $1.25 net
Patent Auger, Swan's .... ⅌ set $1.00 net
Cross Cut Saw Handles—
Atkins' No. 1 Loop, ⅌ pair, 30¢; No. 3, 25¢; No. 2 and No. 4 Reversible, 22¢.
Boynton's Loop Saw Handles .... 50¢, dis 60 %
Champion .... 15¢

Hangers.
Barn Door, old patterns .... dis 60&10&10 %
Barn Door, New England .... dis 60&10&10 %
Climax (Anti-Friction) .... dis 55 %
Zenith Anti-Friction Wood Track .... dis 55 %
Reed's Steel Arm .... dis 40 %
Challenge .... dis 50 %
"Champion" Medina Mfg Co .... dis 60 %
Sterling Improved (Anti-Friction) .... dis 65&10 %
Victor, No. 1, $15; No. 2, $16.50; No. 3, $18 .. dis 50&2 %
Cheritree .... dis 50&5 %
Kidder's .... dis 50&10 @ 50&15 %
U. S .... dis 60&10 %
The "Boss" .... dis 60 %
Best Anti-Friction .... dis 60 %
Duplex (Wood Track) .... dis 60 %
Terry's Patent .... ⅌ doz. pr., 3½ in. $10; 5 in., $12 .... dis 40&5@40&10
Cronk's Patent .... No. 4, $12; No. 5, $14.40; No. 6, $18 .... dis 50&5 @ 50&10 %
Wood Track, Iron Clad .... ⅌ ft. 8¢, dis 50&5 @ 50&10 %
Architect .... ⅌ set $6.00, dis 20 %
Eclipse .... dis 20&10
Felix .... ⅌ set $4.50, dis 20 %
Hamilton Wrought .... dis 50 @ 50&10 %
Richards' (lots of 50 sets dis 20&10&10 %) .. dis 20&10 %
Lane's Steel Anti-Friction .... dis 30&10 %
The Ball Bearing Door Hanger .... dis 20&10 @ 25&10 %
Warner's Patent .... dis 20@20&10 %
Stearns' Anti-Friction .... dis 20 @ 20&10 %
Faultless .... dis 40 %
American .... ⅌ set $6; dis 20&10 %
Rider & Wooster .... dis 50 %

Harness Snaps.
Anchor (T. & S. Mfg Co.) .... dis 65 %
Henshaw's, list of 1½ changed to $14.00 .... dis 65 %
Judd's, list of 1½ changed to $14.00 .... dis 65 %
Fitch's (Bristol), list of 1½ changed to $14.00 .. dis 65 %
Hotchkiss .... dis 10 %
Andrews .... dis 50 %
Sargent's Patent Guarded .... dis 70&10&10 %
German, old list .... dis 75 %
German, Sargent's 1886 list .... dis 50&10 %
Covert .... dis 50&2 %
Covert, New Patent .... dis 50&2 %
Covert New R. E .... dis 60@2 %
Covered Spring .... dis 60&10 %
Meneely's Pat. Safety, new list .... dis 60&10 %
Meneely's Pat. Guard, new list .... dis 60&10 %
Meneely's Pat. Chain Link .... dis 60&10 %

Hatchets.
Standard List, January 1, 1886:
Shingling Hatchets, No. 1, 3¼-in. cut $8.00
Shingling Hatchets, No. 2, 3¾-in. cut 8.50
Shingling Hatchets, No. 3, 4¼-in. cut 9.00
Claw Hatchets, No. 1, 3¼-in. cut 9.00
Claw Hatchets, No. 2, 3¾-in. cut 9.50
Claw Hatchets, No. 3, 4¼-in. cut 10.00
Lathing Hatchets, No. 1, 2½-in. cut 8.00
Lathing Hatchets, No. 2, 2¾-in. cut 8.50
Lathing Hatchets, No. 3, 3½-in. cut 9.00
Half Hatchets, No. 1, 3¼-in. cut 8.50
Half Hatchets No. 2, 3¾-in. cut 9.00
Half Hatchets, No. 3, 3⅜-in. cut 9.50
Broad Hatchets, No. 1, 4-in cut 10.50
Broad Hatchets, No. 2 4½-in. cut 11.50
Broad Hatchets, No. 3, 5-in. cut 13.00
Broad Hatchets, No. 4, 5½-in. cut 14.50
Broad Hatchets, No. 5, 6 in. cut 16.50
Broad Hatchets, No. 6, 6½-in. cut 18.00
Isaiah Blood .... dis 35 @ 40 %
Hunt's Shingling Lath and Claw .... dis 40&5 %
Hunt's Broad .... dis 40 %
Hurd's .... dis 40&5 @ 40&10&5 %
Yerkes & Plumb .... dis 40&10@40&10&5 %
Underhill Edge Tool Co .... dis 40&5 @ 40&10 %
C. Hammond & Son .... dis 40&10 @ 40&10&5 %
Simmons .... dis 35 @ 40 %
Peck's .... dis 40&10 @ 40&10&5 %
Ten Eyck Edge Tool Co .... dis 40&10@40&10&5 %
Collins, following list .... dis 10 %
Shingling, Nos. 1 2 3 .... ⅌ doz $5.50 $6.00 $6.50
Claw, Nos. 1 2 3 .... ⅌ doz 6.00 6.50 7.00
Lathing, Nos. 1 2 3 .... ⅌ doz 5.50 6.00 6.50

Hay Knives.
"Lightning" .... ⅌ doz $18, dis 20 %
Electric .... ⅌ doz $10 @ $12
Gem .... ⅌ doz $13.50
Wadsworth's .... dis 35&5 @ 40 %
Heath Patent .... ⅌ doz $13 @ $13.50
Carter's Needle .... ⅌ doz $18, dis 10&5 @ 10&10 %

Hinges.
Wrought Iron Hinges—
Strap and T .... dis 65&5&2 %
Screw Hook and Strap { 8, 10, 12 in. ⅌ ℔ .... 3½@4¢ / 14 to 36 in. ⅌ ℔ .... 2½@3¢ }
Heavy Welded Hook { 8 to 12 in., ⅌ ℔ .... 3½@4¢ / 14 in. & up, ⅌ ℔ .... 2½@3¢ }
Screw Hook and Eye { ½ in .... ⅌ doz $1.50 / ⅝ in .... ⅌ doz $2.45 / ¾ in .... ⅌ doz $3.80 } dis 10 %
Rolled Blind Hinges, Nos. 32 and 34 .... dis 50&10 %
Rolled Blind Hinges, Nos. 232 and 234 .... dis 55&10 %
Rolled Plate .... dis 70&10 %
Rolled Raised .... dis 70&10 %
Plate Hinges "Providence" { 8, 10 & 12 in., ⅌ ℔ .... 4¼¢ / over 12 in., ⅌ ℔ .... 3¼¢ }
Spring Hinges—
Geer's Spring and Blank Butts .... dis 40 %
Union Spring Hinge Co.'s .... dis 30 %
American Spring Hinge Co.'s .... dis 30 %
Gem Spring Hinges .... dis 30 %
Barker's Double Acting .... dis 20&10 %
Union Mfg. Co .... dis 25 %
Bommer's .... dis 25 %
Buckman's .... dis 25 %
Empire .... dis 60&10 %
Acme .... dis 70 %
Climax .... dis 50&10 %
Chicago .... dis 30 @ 30&10 %
Gate Hinges—
Western .... ⅌ doz $4.40, dis 55 %
N. E .... ⅌ doz $7.00, dis 55 %
N. E. Reversible .... ⅌ doz $5.20, dis 55 %
Clark's, Nos. 1 2 3 .... dis 60&10&2 %
N. Y. State .... ⅌ doz $5.00, dis 55 %
Automatic .... ⅌ doz $12.50, dis 50 %
Common Sense .... ⅌ doz pair $4.50, dis 50 %
Seymour's .... dis 45&10 %
Shepard's, Nos. 1, 2, 10 and 20 .... dis 60&10&10 %
Shepard's, No. 3 .... dis 60&10&5 %
Reed's Hitch and Hinge .... ⅌ doz sets $12, dis 50 %

Hoes.
Handled—
Garden, Mortar, &c .... dis 60&10&5 %
Planter's, Cotton, &c .... dis 60&10&5 %
Warren Hoe .... dis 60 %
Magic .... ⅌ doz $4.75
Eye—
D. & H. Scovil .... dis 15 %
Lane & Gale, S. & O. Pat .... dis 50 @ 50&10 %
Maynard, " " .... dis 60 @ 60&5 %
Sandusky Tool Co., " " .. dis 60&10@60&10&5 %
Hubbard & Bakewell, " " .. dis 60&10@60&10&5 %
Grub .... dis 60&10 @ 60&10&5 %

Hog Rings and Ringers.
Hill's Improved Ringers .... ⅌ doz, $6.00
Hill's Old Style Ringers .... ⅌ doz. 4.00
Hill's Tongs .... ⅌ doz, 6.00
Hill's Rings .... ⅌ doz boxes, 2.25
Perfect Rings .... ⅌ doz boxes $2
Perfect Ringers .... ⅌ doz. $3
Blair Hog Ringers .... ⅌ doz, $1.70 @ $2.00

Hoisting Apparatus.
"Moore's" Hand Hoist, with Lock Brake .... dis 15 %
"Moore's" Differential Pulley Block .... dis 20 %

Hollow-Ware, Iron.
Stove Hollow-Ware, Ground .... dis 50&5@50&10 %
Stove Hollow-Ware, Unground .... dis 50&10&5@60 %
Enameled and Tinned Hollow-Ware—
Kettles .... dis 50&10 %
Oval Boilers, Saucepans and Glue Pots .. dis 30 @ 35 %
Gray Enameled Ware .... dis 40 @ 40&5 %
Agate and Granite Ware .... dis 25 %
Rustless Hollow-Ware .... dis 50 @ 50&5 %
Galvanized Tea-Kettles—

Inch	6	7	8	9
Each	55¢	60¢	65¢	75¢

Hooks.
Cast Iron—
Bird Cage, Sargent's list .... dis 60&10&10 %
Bird Cage, Reading .... dis 60&10&10 %
Clothes Line, Sargent's list .... dis 66⅔&10 %
Clothes Line, Reading list .... dis 66⅔&10 %
Ceiling, Sargent's list .... dis 60&10 %
Harness, Reading list .... dis 60&10&10 %
Coat and Hat, Sargent's list .... dis 60&10 %
Coat and Hat, Reading .... dis 60&10 %
Wrought Iron—
Cotton .... ⅌ doz $1.25
Cotton Pat. (N. Y. Mallet & Handle W'ks) .... dis 30 %
Tassel and Picture (T. & S. Mfg. Co.) .... dis 50 %
Wrought Staples, Hooks, &c .... See Wrought Goods
Bench Hooks .... See Bench Stops
Wire—
Wire Coat and Hat, Gem .... dis 45 %
Wire Coat and Hat, Miles' .... dis 70 %
Belt .... dis 80 @ 80&10 %
Wire Screw Hooks and Eyes .. See Bright Wire Goods
Grass .... ⅌ doz $2.00
Bush .... dis 55 @ 60 %
Whiffletree—Patent .... dis 55 %
Hooks and Eyes—Malleable Iron .... dis 70 %
Hooks and Eyes—Brass .... dis 60&10&10 %
Fish Hooks, American .... dis 40&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10	
Ausable ⅌ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 25&10 %
Clinton, Pl'n. ⅌ ℔		23¢	21¢	20¢	19¢	18¢	dis 25&10 %
Clinton, Fin. ⅌ ℔		24¢	22¢	21¢	20¢	19¢	dis 25&10 %
Essex ⅌ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 40 %
Putnam ⅌ ℔	27¢	24¢	22¢	21¢	20¢	19¢	dis 5&7 %
Vulcan ⅌ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 12½ %
Northwest'n. ⅌ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&10 %
Globe ⅌ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 10&5&5 %
A. C. ⅌ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 25&5 %
C. B.-K. ⅌ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 25 %
Champlain ⅌ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 25&10 %
New Haven ⅌ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 25&10 %
Bridgewater ⅌ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 30 %
Saranac ⅌ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 25 @ 30 %
Champion ⅌ ℔	28¢	25¢	23¢	22¢	21¢	20¢	dis 10&10&5 %
Capewell ⅌ ℔	31¢	28¢	26¢	25¢	24¢	23¢	dis 35&5 %
Star ⅌ ℔	26¢	23¢	21¢	20¢	19¢	18¢	dis 10&10 %

NOTE.—Concessions on above quotations are frequently made to careful buyers.

Horse Shoes —Burden, at factory .... ⅌ keg $3.60
R. I. Horse Shoe Co., Perkins' Imp., at factory .... ⅌ keg $3.60
Walker's Forged .... ⅌ keg $3.60
Mule Shoes, at factory .... ⅌ keg $4.60

Hose, Rubber .... 70 @ 70&5 %
N. Y. B. & P. Co., Standard .... dis 50&10@50&10&5 %

Ice Awls, Chisels, &c.
American Ice Chisel Pol'd .... ⅌ doz $3.00, dis 20 %
National Ice Chisel .... ⅌ doz $6.25, dis 20 %
Novelty Ice Breakers .... ⅌ doz $6.25, dis 20 %
White's Sliding Head Pick .... ⅌ doz $2.50 dis 40 %
Dunlap's Ring Picks .... ⅌ doz $2.00, dis 25 %
Wood Head Picks, Sargent's .... ⅌ doz $1.60, dis 50&10 %
Iron Head Picks, Sargent's .... ⅌ doz $1.25, dis 50&10 %
Ice Mallets, Pick in handle .... ⅌ doz $2.00, dis 15 %
Ice Axes, Small Cast or Mall ... ⅌ doz $1.25, dis 20&10 %
Combination Ice Tools .... ⅌ doz $2.00 net
Acme Ice Pick and Tongs ... ⅌ gross $55.00, dis 50&10 %

Ice Cream Freezers.
Buffalo Champion, S. S. & Co .... dis 60&2 %

Ice Tongs.
Champion, S. S. & Co .... ⅌ doz $4.00, dis 25&10 %
Family .... ⅌ doz $2.75, dis 20 %

Jack Screws.
Millers Falls list .... dis 50 %

Kettles.
Brass, 7 to 17 in. inclusive .... ⅌ ℔ 22¢ net
Brass larger than 17 inches .... ⅌ ℔ 24¢ net
Enameled and Tea Kettles .... See Hollow-Ware

Keys.
Lock Association list Dec. 18, 1885 .... dis 50&2 %
Eagle, Cabinet, Trunk and Padlock .... dis 40&2 %
Hotchkiss' Brass Blanks .... dis 40 %
Hotchkiss' Copper and Tinned .... dis 40 %
Hotchkiss' Padlock and Cabinet .... dis 35 %

Knife Sharpeners.
Parkin's Applewood Handles .... ⅌ doz $6.00, dis 40 %
Parkin's Rosewood or Cocobolo ... ⅌ doz $9.00, dis 40 %

Knives.
Wilson's Butcher Knives .... dis 25 @ 30 %
Ames' Butcher Knives .... dis 25 %
Nichols' Butcher Knives .... dis 40&10 %
Ames' Shoe Knives .... dis 20@25 %
Ames' Bread Knives .... ⅌ doz $1.50, dis 15 @ 20 %
Moran's Shoe and Bread Knives .... dis 20 %
Goodell Co., Butcher, Shoe, Bread, &c .... dis 40 %
Hay and Straw .... See Hay Knives
Table and Pocket .... See Cutlery

Knobs.
Door Mineral
Door Por. Jap'd
Door Por. Por
Door Por. Plated } List Dec. 18, 1885, dis 50&2@—
Hemacite Door Knobs, new list .... dis 35&5@35&10 %
Yale & Towne Wood Knobs, list Dec. 1885 .... dis 40 %
Furniture Plain .... 75¢ gross inch. dis 10 %
Furniture, Wood Screws .... dis 25&10 %
Base, Rubber Tip .... dis 70&10&5 %
Picture, Judd's .... dis 60&10&10 %
Picture, Sargent's .... dis 66⅔&10 %
Picture, Hemacite .... dis 35&5 %
Shutter, Porcelain .... dis 65&10 %
Carriage, Japanned .... ⅌ gross 80¢, dis 60&10 %

Ladles.
Melting, Sargent's....dis 55&10 %
Melting, Reading....dis 35&10 %
Melting, Monroe's Patent....₩ doz. $4.00, dis 40 %
Melting, P. S. & W....dis 35 @ 35&10 %
Melting, Warner's....dis 30 %

Lanterns.
Tubular, Standard No. 0, ₩ doz....$6.75 @ $7.00
Tubular, Standard No. 1, ₩ doz....8.25 @ 8.50
Tubular, Lift Wire, No. 0, ₩ doz....8.50
Tubular, Lift Wire, No. 1, ₩ doz....10.00
Guards for Tubulars, add ₩ doz....25
Police, Small, $6.00; Medium, $7.25; Large, $9.75....dis 10@15 %
Porter's Tin R. R.,....$10 dis 20 %
Owl....$9, dis 20@25 %

Lawn Mowers.—Regular List....dis 50 %

Lemon Squeezers.
Porcelain Lined....₩ doz. $6.00, dis 35&5 %
Wood....₩ doz. $3.00, dis 35 %
Eureka, Tinned....₩ doz. $8.00, dis 10 %
Dunlap's Improved....₩ doz. $3.75, dis 20 %
Sammis'....No. 1, $5; 2, $9; 12, $18 ₩ doz., dis 25&10 %
Townsend's Patent....$6.00 ₩ doz., dis 33⅓ %
Jennings' "Star"....$3.00 ₩ doz. net
The "Boss"....₩ doz. $4.00, dis 10&10 %
Dean's Nos. 1, ₩ doz. $15.00; 2, $8.00; 3, $5.50....dis 55 %
Little Giant....dis 50 %
Acme....₩ gross $55.00, dis 50

Lines.
Cotton and Linen Fish, Draper's....dis 50 %
Draper's Chalk....dis 60 %
Draper's Mason's Linen, 84 ft., No. 1, $1.20; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25..dis 25 %
Cotton Chalk....dis 55 %
Silver Lake, Braided, Nos. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gross....dis 25 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50
Masons' Colored Cotton....dis 45
Wire Clothes, No. 18, $3.50; No 19, $3; No. 20, $2.50.
Ventilator Cord, Samson Braided, White or Drab Cotton....$7.50 ₩ doz. dis 20 %

Locks, Padlocks, Cabinet Locks, &c.
Door Locks, Latches, &c.—
List, Dec. 18, 1885....dis 50&2 %
Nimick & Brittan's Burglar-Proof Locks..dis 50&2 %
Reading Hardware Co. (list Feb. 2, 1885)....dis 70 %
Perkins' Burglar Proof....dis 60&25 %
Plate....dis 33⅓&2 %
F. Many's "Extension Cylinder"....$10.50 ₩ doz net
Barnes Mfg. Co....dis 40 %
Yale Flat Key....dis 40 %
Dietz Flat Key....dis 30 %
L. & C. Round Key Latches....dis 40&10 %
L. & J. Flat Key Latches....dis 33⅓&10 %
Night Latches....dis 20 %
Yale new list....dis 40 %
"Shepardson" or "U. S."....dis 35 %
"Felter" or "American"....dis 40&10 %
Cabinet—
Eagle, Gaylord, Parker, Corbin — Changes made in list price of some numbers March 10, 1884, and Jan. 1, 1885. dis 40&2 % cash.
A. E. Deitz....dis 30@40 %
Stoddard Lock Co....dis 30 %
A. E. Deitz, Flat Key Drawer....dis 30@40 %
"Champion" Night Latches....dis 40 %
Yale....dis 40 %
Barnes Mfg. Co....dis 40 %
Eagle and Corbin Trunk....dis 25&2 %
"Champion" Cabinet and Combination....dis 33⅓ %
Romer's....dis 25 %
Padlocks—
Russell & Erwin, Mallory, Wheeler & Co., Nimick & Brittan Mfg. Co., Wm. Wilcox & Co., Norwich Lock Co. — New list Dec. 23, 1884. Dis 66⅔@70@70&10, but prices are very irregular.
Yale Lock Mfg. Co.'s....dis 40 %
Eagle....dis 25&2 %
Eureka, Eagle Lock Co....dis 40&2 %
Romer's, Nos. 0 to 91....dis 35 %
Romer's, Nos. 200 to 505....dis 20 %
A. E. Dietz....dis 35 %
"Champion" Padlocks....dis 33⅓ %
Hotchkiss....dis 30 %
"Star"....dis 45 %
"Horse Shoe," ₩ doz., $9....dis 40 %
Barnes Mfg. Co....dis 40 %
Nock's....dis 30 %
Brown's Patent....dis 25 %
Scandinavian....dis 90 %
Fraim's Pat. Scandinavian, new list (low)....dis 60 %

Lumber Tools.
Ring Peavies, "Blue Line" Finish....₩ doz $20.00
Ring Peaves, Common Finish....₩ doz $18.00
Steel Socket Peavies....₩ doz $21.00
Mall. Iron Socket Peavies....₩ doz $19.00
Cant Hooks, "Blue Line" Finish....₩ doz $16.00
Cant Hooks, Common Finish....₩ doz $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish....₩ doz $16.00
Cant Hooks, Mall. Socket Clasp Common Finish....₩ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Fin. ₩ doz $14.00
Cant Hooks, Clip Clasp, Common Finish..₩ doz $12.00
Hand Spikes....₩ doz 6 ft., $15.00; 8 ft., $20

	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.
Pike Poles, Pike & Hook, ₩ doz	$11.50	12.50	14.50	17.50	21.50
Pike Poles, Pike only, ₩ doz	10.00	11.00	13.00	16.00	20.00
Pike Poles, not ironed, ₩ doz	6.00	7.00	9.00	12.00	16.00
Setting Poles, ₩ doz	14.00	15.00	17.00		

Swamp Hooks....₩ doz $18.00
Landing Blocks....₩ doz $22.50
Skidding Tongs....₩ doz $51.00
Log Binders....₩ doz $26.00
Bended Boot Calks, 1 to 5 M, dis 25 %; 5 to 10 M, dis 30 %
Square Steel Boot Calks....dis 40 %
Chain Rafting Dogs....₩ 100 $12.50
Ring Rafting Dogs...₩ 100, med., $10.00; large, $12.00
Timber Grapples....₩ doz $30.00

Lustro.
Four-ounce bottles....₩ doz. $1.75; ₩ gro. $17.00 net

Mallets.
Hickory....dis 20&10 %
Lignumvitæ....dis 20&10 %
Penfield Block Co., Hickory and L. V..dis 30 @ 30&10 %

Mattocks.
Regular list....dis 60&10 %

Meat Cutters.
Dixon's—Nos. 1, 2, 3, 4; ₩ doz..$14.00, 17.00, 19.00, 30.00—dis 45 @ 45&5 %
Woodruff's....Nos. 100, 150; ₩ doz. $15.00, 18.00—dis 45@45&5 %
Champion....Nos. 200, 300, 400; ₩ doz. $22.00, 27.00, 40.00—45@45&5 %
Hales'....Nos. 11, 12, 13; ₩ doz...$27.00, 33.00, 45.00 } dis 60&10&10 @ 70 %
American....dis 35 %
Nos. 1, 2, 3, 4B; Each $5.00, 7.00, 10.00, 25.00, 50.00, 60.00
Enterprise....dis 30 %
Nos. 10, 12, 22, 32, 42; Each $3.00, 2.50, 4.00, 6.00, 10.00
Pennsylvania....dis 40&10 %
Nos. 1, 2, 3, 00; ₩ doz. $24.00, 28.00, 36.00, 28.00
Miles' Challenge..Nos. 1, 2, 3; ₩ doz..$22.00, 30.00, 40.00—dis 45@45&5 %
Kieser's No. 55....$40 ₩ doz, dis 40 @ 40&10 %
Kieser's Gem....$25 ₩ doz, dis 40 @ 40&10 %
Kieser's Monarch....$45 ₩ doz, dis 40 @ 40&10 %
Kieser's Butcher....$40 each, dis 20 @ 20&5 %
Draw Cut..Nos. 5, 2, 6, 8, 10; Each..$50.00, 75.00, 80.00, 225.00, 400.00—dis 20 %
Beef Shavers (Enterprise Mfg. Co.)....dis 20&10 %
Chadborn's Smoked Beef Cutter....₩ doz, $66.00

Mincing Knives.
Am. (2d quality), ₩ gro, 1 blade, $7; 2 blades, $12; 3 blades, $18....Net
Lothrop's....dis 20&10 %
Smith's, ₩ doz, Single, $2.00; Double, $3....dis 40@45 %
Knapp & Cowles....dis 50&10@60 %

Molasses Gates.
Stebbins' Pat's....dis 70&10 @ 75 %
Stebbins' Genuine....dis 60&10 %
Stebbins' Tinned Ends....dis 40&10 %
Chase's Hard Metal....dis 50&10 %
Bush's....dis 20 %
Lincoln's Pattern....dis 70&10 %
Weed's....dis 20&10 %
Boss Nos.. 1, 2, 3, 4; $7.00, 8.00, 9.00, 10.00..₩ doz, dis 60&10&10 %

Money Drawers.—₩ doz., $18.

Nails....See Trade Report
Wire Nails, list Nov. 11, 1885....dis 50 @ 50&5 %
Wire Carpet Nails....See Tacks

Nail Puller.
Curtiss Hammer....₩ doz $9.00 net
Giant, No. 1....₩ doz $30.00, dis 10 %
Pelican....₩ doz $9.00, dis 25 %

Nuts and Washers.
Square Nuts, ⅜ and smaller....9½¢ off list
Square Nuts, 7-16 and larger....8½¢ off list
Hexagon Nuts, ⅜ and smaller....10½¢ off list
Hexagon Nuts, 7-16 and larger....9½¢ off list
Washers, ⅜ and smaller....9½¢ off list
Washers, 7-16 and larger....8½¢ off list
In lots less than 100 ℔, ₩ ℔ add ½¢ to list, 1 ℔ boxes, 1¢ to list.

Nut Crackers.
Table (Humason & Beckley Mfg. Co.)....dis 40 %
Blake's Pattern....₩ doz $2.00, dis 10 %
Turner & Seymour Mfg. Co....dis 50 %

Oakum.
Government....₩ ℔ 7¢
U. S. Navy....₩ ℔ 6½¢
Navy....₩ ℔ 5½¢

Oilers.
Zinc and Tin....dis 65@65&10 %
Brass and Copper....dis 50&10 %
Malleable, Hammers' Improved, No 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz....dis 10 @ 10&10 %
Malleable, Hammers Old Pattern, same list, in gross lots....dis 45 %
Prior's Patent or "Paragon" Zinc....dis 60&5 @ 60&10 %
Prior's Patent or "Paragon" Brass....dis 50 %
Olmstead's Tin and Zinc....dis 60 %
Olmstead's Brass and Copper....dis 50 %
Broughton's Zinc....dis 60 %
Broughton's Brass....dis 50 %

Packing, Steam.
N. Y. Belting & Packing Co....dis 50 @ 50&10 %
American Packing....10¢@11¢
Russia Packing....14¢
Italian Packing....14 @ 15¢
Cotton Packing....15 @ 18¢

Padlock.—See Locks.

Pails, Galvanized Water.

Quarts	10	12	14
Hill's Light Weight, ₩ doz	$2.75	3.00	3.25
Hill's Heavy Weight, ₩ doz	3.00	3.25	3.75
Whiting's	2.75	3.00	3.25
Fire Buckets	2.75	3.25	3.50

Buckets, see Well Buckets.

Pencils
Faber's Carpenters'....high list, dis 50 %
Faber's Round Gilt....₩ gro $5.25 net
Dixon's Lead....₩ gro $4.50 net
Dixon's Lumber....₩ gro $6.75 net
Dixon's Carpenters'....dis 40&10 %

Picks.
Railroad, 5 to 6, $11.00; 6 to 7, $12....dis 60&10 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13....dis 60&10 %

Picture Nails.
Brass Head, Sargent's list....dis 50&10&10 %
Brass Head, Combination list....dis 50&10 %
Porcelain Head, Sargent's list....dis 50&10&10 %
Porcelain Head, Combination list....dis 40&10 %
Niles' Patent....dis 40 %

Pinking Irons....₩ doz 65¢ net

Pipe, Wrought Iron.
1¼ and under, Plain....dis 42½ %
1¼ and under, Galvanized....dis 32½ %
1½ and over, Plain....dis 60 %
1½ and over, Galvanized....dis 42½ %
Boiler Tubes....dis 52½ %

Planes and Plane Irons.
Wood Planes—
Molding....dis 15&2 %
Bench, First Quality....dis 20&2 %
Bench, Second Quality....dis 25&2 %
Iron Planes—
Bailey's (Stanley R. & L. Co.)....dis 20&10 %
The Stanley (S. R. & L. Co.)....dis 20&10 %
Bailey's "Victor"....dis 20&10 %
Steer's Iron Planes....dis 35 %
Meriden Mal. Iron Co.'s Iron Planes....dis 20&10 %
Davis's Iron Planes....dis 20&10 %
(Small extras often given by others.)
Plane Irons—
Plane Irons....dis 20&10 %
Plane Irons, Butcher's....$5.00 @ $5.25 to £
Plane Irons, Buck Bros....$5.00 to £
Plane Irons, Middlesex Mfg. Co., "Baldwin Iron"....dis 33⅓ %
L. & I. J. White....dis 25 %

Pliers and Nippers.
Button's Patent....dis 30&10 @ 40 %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $13.50; No. 4, 7 in., $21.00 ₩ doz dis 20&10@33⅓ %
Humason & Beckley Mfg. Co....dis 60 %
Gas Pliers....dis 60 %
Eureka Pliers and Nippers....dis 40 %
Russell's Parallel....dis 25 %
P. S. & W. Cast Steel....dis 50 %
P. S. & W. Tinners' Cutting Nippers....add 6 % dis 10 %

Plumbs and Levels.
Standard List....dis 70&10@70&10&10 %
Disston's....dis 45&10 %
Pocket Levels....dis 70&10@70&10&10 %
Davis' Inclinometers....dis 10&10 %

Poppers, Corn.
Round or Square, 1 qt....₩ gro $14.50 @ $15
Round or Square, 2 qt....₩ gro $25 @ $26

Post Hole and Tree Augers and Diggers.
Samson Post Hole Digger....₩ doz $36.00, dis 20&10 %
Fletcher Post Hole Augers....₩ doz $36.00, dis 20 %
Eureka Diggers....₩ doz $21 @ $20
Leed's....₩ doz $8.50 @ $9.00
Vaughan's Hollow Tube Post Hole....per doz, $24.00....dis 33⅓ @ 20&10&10 %
Kohler's Little Giant....₩ doz $24
Kohler's Hercules....₩ doz $18.00
Kohler's New Champion....₩ doz $10.00
Schneider....₩ doz $24, dis 2 % cash
Ryan's Post Hole Diggers....₩ doz $24
Cronk's Post Bars....₩ doz $60, dis 50&5 @ 50&10 %

Potato Parers.
White Mountain....₩ doz $5.50
Antrim Combination....₩ doz $8.00
Hoosier....₩ doz $13.50

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw. ₩ doz $18.00....dis 20&10 %
Disston's Pruning Hook....₩ doz $12.00, dis 20&10 %
E. S. Lee & Co.'s Pruning Tools....dis 40 %
Pruning Shears....₩ doz $3.75 @ $4.00 net
Henry's Pruning Shears....₩ doz $4.50 net
Wheeler, M. & Co.'s Combination...₩ doz $12, dis 20 %
Dunlap's Saw and Chisel....₩ doz $8.50, dis 30 %
J. Mallinson & Co., A. & B. Co. list....dis 33⅓ %

Pulleys.
Hot House, Awning, &c....dis 66⅔&10 %
Japanned Screw....dis 66⅔&10 %
Brass Screw....dis 70&10 %
Japanned Side....dis 66⅔&10 %
Japanned Clothes Line....dis 60&10 %
Hay Fork, Solid Eye, $4.00; Swivel, $4.50....dis 50&10 @ 50&10&5 %
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70....dis 50 %
Hay Fork, "F" Common and Pat. Bushed....dis 20 %
Hay Fork, Tarbox Pat. Iron....dis 20 %
Shade Rack....dis 45 %
Tackle Blocks....See Blocks

Pumps.
Cistern, Best Makers....dis 50 %
Pitcher Spout, Best Makers....dis 60 %
Pitcher Spout, Cheaper Goods....dis 70 @ 70&10 %

Punches.
Saddlers' or Drive, good quality....₩ doz 65¢ @ 70¢
Bemis & Call Co.'s Cast Steel Drive....dis 50&5 %
Bemis & Call Co.'s Springfield Socket....dis 50&5 %
Spring, good quality....₩ doz $2.50 @ $2.60
Spring, Leach's Patent....dis 15 %
Bemis & Call Co.'s Spring and Check....dis 40 %
Solid Tinners'....₩ doz $1.44, dis 55 %
Tinners' Hollow Punches....dis 20&2 %

Rail.
Sliding Door, Wrought Brass ₩ ℔ 35¢, dis 20@25 %
Sliding Door, Bronzed Wrt. Iron....₩ foot 7¢
Sliding Door Iron, Painted....₩ foot 4¢, dis 20&10&5 %
Barn Door, Light....Inch. ⅝, ¾, ⅞; Per 100 feet....$2.50, 3.00, 4.40—dis 10 %
S. D. for N. E. Hangers— Small, Med., Large; Per 100 feet....$2.15, 2.70, 3.25 net
Terry's Wrought Iron, 5¢ ₩ foot....net
Victor Track Rail, 7¢ ₩ foot....dis 50&2 %

Rakes.
Cast Steel....dis 60&10 @ 60&10&10 %
Malleable....dis 60&10 @ 60&10&10 %

Razor
J. R. Torrey Razor Co....dis 20 %
Wostenholme & Butcher....$10 to £, dis 10 %

Razor Strops.
Genuine Emerson....dis 60 %
Imitation Emerson....₩ doz $2.00, dis 20&10&10 %
Torrey's....dis 20 %
Badger's Belt and Combination....₩ doz $2
Lamont Combination....₩ doz $4

Rivets.
Black and Tinned Iron, Flat Head M Rivets (in packages and in bulk); Block and Carriage (in C packages)....dis 50 %
Iron Rivets (other than above) in bulk; Black and Tinned Burrs....dis 45 %
Bay State, ordinary, in bulk....dis 55 %
Note.—Rivets are frequently sold at concessions from above prices.
Copper Rivets and Burrs....dis 60&5 @ 60&10 %

Nos.	7	8	9	10	11	12	13	14	1o
₩ ℔	49¢	50¢	52¢	54¢	56¢	58¢	60¢	65¢	70¢

Rivet Sets....dis 50&2 %

Rods.
Stair, Brass....dis 25&5 %
Stair, Black Walnut....₩ doz 50¢

Rollers.
Barn Door, Sargent's list....dis 60&10&10 %
Acme (Anti-Friction)....dis 55 %
Union Barn Door Roller....dis 70 %

Rope.
Mnf'rs list, February 6, 1886.
Manila....½ inch and larger ₩ ℔ 12½¢
Manila....⅜ inch ₩ ℔ 13¢
Manila....¼ and 5-16 inch ₩ ℔ 13½¢
Manila Tarred Rope....₩ ℔ 12¢
Manila, Hay Rope....₩ ℔ 12½¢
Sisal....½ inch and larger ₩ ℔ 9¢
Sisal....⅜ inch ₩ ℔ 9½¢
Sisal....¼ and 5-16 inch ₩ ℔ 10¢
Sisal, Hay Rope....₩ ℔ 9¢
Sisal, Tarred Rope....₩ ℔ 8½¢
Sisal, Single Ply Lath Yarn....₩ ℔ 8¢
(Dis 1@1½¢ ₩ ℔.)
Cotton Rope....₩ ℔ 15 @ 18¢ net
Jute Rope....₩ ℔ 7¢

Rules.
Boxwood....dis 80&10 %
Ivory....dis 55 @ 55&10 %
Stephens' Ivory....dis 50 %

Sad Irons.
From 4 to 10, at factory....₩ 100 ℔ $2.35 @ $2.50
Self-Heating....₩ doz. $9.00 net
Self-Heating, Tailors'....₩ doz. $18.00 net
Gleason's Shield and Toilet....dis 25 %
Mrs. Pott's Irons, Double Pointed....dis 40 @ 40&5 %
Mrs. Pott's Irons, Square Back....dis 40 @ 40&5 %
Enterprise Star Irons, new list, July 20, 1882....dis 40 %
Combined Fluter and Sad Iron...₩ doz. $15.00, dis 15 %
Fox Reversible, Self-Fluter....₩ doz. $24.00 net
Chinese Laundry (N. E. Butt Co.)....8½¢, dis 15 %
New England....5¢, dis 15 %

Sand Paper and Emery Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.50 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3....5.00 ₩ ream
Baeder & Adamson's Flint, assorted....4.75 ₩ ream
Baeder & Adamson's Star....3.75 ₩ ream
(dis 40@45 %)
Bloodgood's Flint, Nos. 00 to 1½....₩ ream $4.50
Bloodgood's Flint, assorted....₩ ream 4.50
Bloodgood's Flint, Nos. 2 to 3....₩ ream 5.00
Bloodgood's Flint, No. 3½....₩ ream 5.50
Columbia Flint, all Nos....₩ ream 4.00
Madison Mills Flint, all Nos....₩ ream 3.75
(dis 40@45 %)
Emery Paper, 00 to 1½, $8.50; 2, $7.50; 2½, $9.50....dis 40 @ 45 %
Emery Cloth, B. A. & Co., 00 to 1½, $18; 2, $20; 2½, $24....dis 40 @ 45 %
Emery or Crocus Cloth, Sibley, 9x12 in., $16.00; Emery or Crocus Cloth, Sibley, 7x9 in., $10.50....dis 20 %
New England, same list as B. & A. Flint...dis 40 @ 45 %
Sand Paper without brand....₩ ream, $1.75 @ $2

Sash Cord.
Common....₩ ℔, 12½¢ @ 13¢ net
Patent....₩ ℔, 15¢ @ 16¢ net
White Cotton Braided, fair quality....₩ ℔ 28¢ @ 30¢
Common Russia Sash....₩ ℔ 14¢
Patent " "....18¢
Cable Laid Italian "....26¢
India Cable Laid "....14¢
Silver Lake, A Quality, White....50¢, dis 10&10 %
Silver Lake, A Quality, Drab....55¢, dis 10&10 %
Silver Lake, B Quality, White..50¢, dis 10&10&10@30 %
Silver Lake, B Quality, Drab...55¢, dis 10&10&10@30 %
Silver Lake, C Quality, White (only)....28¢ @ 29¢
Sylvan Spring, A Quality, 50@55¢ dis 10&10@10&10&10 %
Samson, Braided, White Cotton....50¢ dis 20 %
Samson, Braided, Drab Cotton....55¢ dis 20 %
Samson, Braided, Italian Hemp....55¢ dis 20 %
Samson, Braided, Linen....80¢ dis 20 %

Sash Locks.
Clark's No. 1, $10.00; No. 2, $8.00 ₩ gross....dis 33⅓ %
Ferguson's....dis 33⅓ %
Morris....dis 50&10 %
Morris' Triumph, list Jan. 1, 1886....dis 50&10 %
Walker's....dis 10 %
Attwell Mfg. Co....dis 25 @ 33⅓ %
Hammond's Window Springs....dis 40 %
Common Sense, Japanned, Coppered and Bronzed....₩ gross
Common Sense, Nickel Plated....₩ gross $12.00 net
Universal....dis 30 %
Kempshall's Gravity....dis 60 %
Kempshall's Model....dis 60@60&10 %
Corbin's Daisy....dis 60&5@60&10 %
Payson's Perfect....dis 50&10&5 @ 60 %
Hugunin's New and Improved Adjustable Sash Balances, list March, 1885....dis 33⅓ %
Hugunin's New Sash Locks, list March, 1885..dis 33⅓ %
Stoddard "Practical"....dis 10 %
Ives Patent....dis 55 %
Liesche's Nos. 100 & 110, ₩ gro, $8; 105, $10..dis 20&10 %

Sash Weights.
Solid Eyes, in ton lots....₩ ton, $20

Sausage Stuffers or Fillers.
Miles' "Challenge"....₩ doz. $20, dis 45@45&5 %
Perry....₩ doz. No. 1, $15; No. 0, $21, dis 45@45&5 %
Draw Cut No. 4....each, $30.00, dis 20 %
Enterprise Mfg. Co....dis 20&10 @ 30 %
Silver's....dis 25 %

Saws
Disston's Circular, Mill and Cross Cut....dis 45&10 %
Disston's Hand, Panel, Rip, &c....dis 20&10 %
Atkins' Silver Steel Circular....dis 40 %
Atkins' Selected Steel Circular....dis 50 %
Atkins' Silver Steel Diamond X Cuts....₩ foot 75¢
Atkins' Concave Tooth Dexter X Cuts....₩ foot 55¢
Atkins' Special Steel Diamond X Cuts....₩ foot 34¢
Atkins' Champion Tooth X Cuts....₩ foot 32¢
Atkins' Hollow Back X Cuts....₩ foot 22¢
Atkins' Band....dis 25 %
W. M. & C., Hand....dis 30 @ 30&5 %
W. M. & C. Champion X Cuts, Regular....₩ foot 26¢
W. M. & C. X Cuts, Thin Back....₩ foot 29¢
Peace Circular and Mill....dis 45&10 %
Peace Hand Panel and Rip....dis 20&10 @ 20&10&5 %
Peace Cross Cuts, Standard....₩ foot 25¢
Peace Cross Cuts, Thin Back....₩ foot 28¢
Peace Band Saws, all widths....dis 20&10 %
Richardson's Circular....dis 45 %
Richardson's Mill....dis 45 %
Richardson's X-Cuts, No. 1, 30¢; No. 2, 27¢; No. 3, 25¢
Richardson's Hand, Panel, Butcher, &c....dis 25&5 %
Boynton's Lightning X Cuts....₩ ft 32¢
Boynton's Lightning One Man X Cuts..₩ ft 38¢ @ 40¢
Boynton's Lightning Buck Saws....₩ doz $6.00
Hack Saws—
Griffin's Hack Saws, complete....dis 40&10 %
Griffin's Hack Saw, Blades only....dis 40&10 %
Star Hack Saws and Blades....dis 25 %

Saw Frames.
White, Vermont....₩ doz $1.50, dis 25&10 %
Red, Polished and Varnished....₩ doz $1.50, dis 10 %
Saw Rods....$10 list dis 10&10 %

Saw Sets.
Stillman's Genuine....₩ doz $5.00 and $7.75, dis 40&5 %
Stillman's Imita..₩ doz $3.25 and $5.25, dis 40&5@40&10 %
Common Lever....₩ doz $2.00, dis 40&5 %
Leach's....No. 0, $8.00; No. 1, $15.00, dis 15 %
Nash's....dis 20&10 @ 20&10&10 %
Hammer, Hotchkiss....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent....dis 30&5 %
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate....dis 10 %
Bemis & Call Co.'s Cross Cut....dis 12½ %
Aiken's Genuine....$13.00, dis 50&10 %
Aiken's Imitation....$7.00, dis 55&5 %
Hart's Patent Lever....dis 20 %
Disston's, Star, $9, No. 15 Hammer, $5.50...dis 20&10 %
Atkins' Adjustable....per doz $6.00
Atkins' Criterion....per doz $7.00
Morrill's No. 1, $15.00; Nos. 3 and 4, $24....dis 40&10 %
Croussant (Keller) No. 1, $15.00; No. 2, $24.00, dis 33⅓&10 %
Boynton's No. 1, $12 ₩ doz; No. 2, $10....dis 25 %

Saw Tools.
Atkins' Patent....per doz sets $6.00

Scales.
Hatch, Counter, No. 171....₩ doz $42.00, dis 50&10 %
Hatch, Tea, No. 161....₩ doz $15.00, dis 50&10 %
Union Platform, Plain....$2.15 @ 2.20
Union Platform, Striped....$2.30 @ 2.40
Chatillon's Grocers' Trip Scales....dis 50 %
Chatillon's Eureka....dis 25 %
Chatillon's Favorite....dis 40 %
Family, Turnbull's....dis 30@30&10 %

Scale Beams.
Scale Beams, List of Jan. 12, 1882..dis 60&5 @ 60&10 %
Scale Beams, Custer....dis 25 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.) $6.50, dis 20&10 %
Box, 1 Handle....₩ doz $4.00, dis 10 %
Box, 2 Handle....₩ doz $6.00, dis 10 %
Defiance Box and Ship....dis 20&10 %
Foot....dis 50&10@60 %
Ship, Common....₩ doz $3.50 net
Ship, Providence Tool Co....dis 10 %

Screen Corners.
Porter's Pat. Window and Door Frame....dis 33⅓ %
Screen Corner Irons, Warner's....dis 33⅓ %

Screw Drivers.
Douglas Mfg Co....dis 20&10&10 %
Disston's....dis 45&10 %
Disston's Patent Excelsior....dis 45&10 %
Buck Bros....dis 30 %
Stanley R. & L. Co.'s Varnished Handles....dis 60&10 %
Stanley R. & L. Co.'s Black Handles....dis 50&10 %
Sargent & Co.'s Nos. 1 & 20 Forged Blade..dis 70&10 %
Sargent & Co.'s Nos. 40 & 30, Cast Steel....dis 60&10 %
Sargent & Co.'s No. 60, Round Blade....dis 60&10 %
Knapp & Cowles' No. 1....dis 60&20 @ 70 %
Knapp & Cowles' No. 1 Extra....dis 60 @ 60&10 %
Knapp & Cowles No. 00 & 4....dis 50&5 @ 50&10 %
Sets interchangeable....₩ doz $18.00, dis 25 %
Champion....dis 25 %
Clark's Patent....dis 20&10 @ 33⅓ %
Crawford's Adjustable....dis 30 %
Knapp & Cowles' Screw-Driver Bitts....₩ doz 90¢
Eilrich's Socket and Ratchet....dis 25 %
Allard's Spiral, new list....dis 25 %

Screws.
Wood Screws—List, February 15, 1886.
Flat Head Iron....dis 75&10 %
Round Head Iron....dis 70&10 %
Flat Head Brass....dis 75 %
Round Head Brass....dis 70 %
Flat Head Bronze....dis 75 %
Round Head Bronze....dis 70 %
Machine—
Flat Head, Iron....dis 60 %
Round Head, Iron....dis 55 %
Bench and Hand—
Bench, Iron....dis 55&10 @ 55&10&10 %
Bench, Wood, Beech....₩ doz $2.25
Bench, Wood, Hickory....dis 20&10 %
Hand, Wood....dis 25&10 @ 25&10&5 %
Lag or Coach....dis 75&10 @ 80 %
Coach, Patent Gimlet Point....dis 75 @ 75&5 %
Bed....dis 25&5 %
Hand Rail, Sargent's....dis 66⅔&10 %
Hand Rail, Humason, Beckley & Co.'s....dis 70 %
Hand Rail, Am. Screw Co....dis 70 %

Scroll Saws.
Lester, complete, $10.00....dis 25 %
Rogers, complete, $4.00....dis 25 %

Scythes.
Grain Scythes—
Clipper, Full Polished, Boxed & Sharp...₩ doz $8.90
German, Cast or Silver Steel, either Half Set or Waldron, in Straw....₩ doz $8.35
Grass Scythes—
Silver Clipper, Boxed and Sharp....₩ doz $7.00
German Steel, Half Set Waldron....₩ doz $6.10
Cast Steel and German Steel, Full Set or Waldron, Sharp and Boxed....₩ doz $6.70
Bush, Bramble and Weed....₩ doz $6.70
Clover....₩ doz $7.00
Imperfect Grass and Bush....₩ doz $5.00
Imperfect Grain....₩ doz $6.70
Lawn—same price as corresponding finish.

Scythe Snaths....dis 40&5&2 %

Shears.
American (Cast) Iron....dis 75&10 @ 75&10&5 %
Pruning....See Pruning Hooks and Shears
Barnard's Lamp Trimmers....₩ doz $3.75
Tinners'....dis 20&2 %
Seymour's, List, Dec., 1881....dis 60&10&5 %
Heinsch's, List, Dec., 1881....dis 60&10 %
Heinsch's Tailor's Shears....dis 33⅓ %
First quality C. S. Trimmers....dis 80 %
Second quality C. S. Trimmers..dis 80&10 @ 80&10&5 %
Acme Cast Shears....dis 10&10 %
Diamond Cast Shears....dis 10 %
Clipper....dis 10&10 %
Victor Cast Shears....dis 75&10 %
Howe Bros. & Hulbert, Solid Forged Steel....dis 40 %

Sheaves.
Sliding Door—
M. W. & Co., list Dec. 18, 1885....dis 50&2 %
R. & E., list Dec. 18, 1885....dis 60&2 %
Corbin's list....dis 60&10&2 %
Patent Roller....dis 60&10&2 %
Patent Roller, Hatfield's....dis 70 %
Russell's Anti-Friction, list Dec. 18, 1885..dis 60&2 %
Moore's Anti-Friction....dis 60 %
Sliding Shutter—
R. & E. list Dec. 18, 1885....dis 60&10&2 %
Sargent's list....dis 60&10&10 %
Reading list....dis 60&10&10 %

Ship Tools.
L. & I. J. White....dis 20&5 %
Albertson Mfg. Co....dis 25 %

Shovels and Spades.
Ames' Shovels, Spades, &c., list Nov. 1, 1885....dis 20 @ 20&10 %
Griffith's Black Iron....dis 50&10 %
Griffith's Steel....dis 60 @ 60&5 %
Griffith's Solid Cast Steel R. R. Goods....dis 20 %
Old Colony....dis 15 @ 15&10 %
St. Louis Shovel Co....dis 20 %
Hussey, Binns & Co....dis 20 @ 30 %
Lehigh Mfg. Co....dis 50&10 %
Payne Pettebone & Son, list Jan. 2, 1882....dis 50&5 %
Remington's (Lowman's Patent)....dis 30 @ 30&10 %
Rowland's, Black Iron....dis 50&10 %
Rowland's Steel....dis 60&5 %

Shot.
Drop, ₩ bag, 25 ℔ (2¢ off for cash in 10 days)....$1.45
Drop, ₩ bag, 5 ℔....35

Shovels and Tongs.
Iron and Brass Head....dis 60&10&5@60&10&10 %

Sieves.
Buffalo Metallic, S. S. & Co., new list....dis 50&20 %
Barler's Flour Sifters....₩ doz $2 50

Sieves, Wooden Rim—	Iron.	Plated.
Mesh 18, Nested, ₩ doz	65¢	83¢
Mesh 20, Nested, ₩ doz	80¢	95¢
Mesh 24, Nested, ₩ doz	95¢	$1.05

Slates.
School, by case....dis 45 @ 50 %

Soldering Irons.
Covert's Adjustable, list Jan. 1, 1886....dis 35&2 %

Spoke Shaves.
Iron....dis 45 %
Wood....dis 30 %
Bailey's (Stanley R. & L. Co.)....dis 40&10 %
Stearns'....dis 30&10 @ 30&10&10 %

Spoke Trimmers.
Bonney's....₩ doz $10.00, dis 50 %
Stearns'....₩ doz $9.00, dis 20&10 %
Ives'....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'....₩ doz $9.00, dis 20 %

Spoons and Forks.
Tinned Iron—
Basting, Central Stamping Co.'s list....dis 33⅓&2 %
Solid Table and Tea, Central Stamping Company's list....dis 33⅓&2 %
Buffalo, S. S. & Co....dis 50&10 %
Silver-Plated—
Meriden Brit. Co., Rogers....dis 50&5 %
Reed & Barton....dis 50&5 %
Wm. Rogers Mfg. Co....dis 50&10 @ 60 %
Simpson, Hall, Miller & Co....dis 50&10@50&10&5 %
Holmes, Booth & Haydens....dis 50&10&5 @ 60 %
Holmes & Edwards Silver Co....dis 60 @ 60&10 %
Cast Steel, Silver Plated....dis 40 %
H. & E. Silver Co. Steel Silver-Plated Teas, $15; Tables, $30....dis 50 @ 50&10 %
German Silver....dis 50 %
Britannia....dis 60&10 @ 60&10&10 %

Springs.
Elliptic, Concord, Platform and Half Scroll....dis 60&10&5 %

Squares.
Steel and Iron; Nickel-Plated....dis 70&10@70&10&10 %
Try Square and T Bevels....dis 60&10 %
Disston's Try Square and T Bevels....dis 45&10 %
Winterbottom's Try and Miter....dis 20&10 %

Staples.
Fence Staples, Galvanized....₩ ℔, 4½¢
Fence Staples, Plain....₩ ℔, 3½¢

Steelyards....dis 40&10@50&5 %

Stocks and Dies.
Blacksmith's....dis 25@30 %
"Lightning" Screw Plate....dis 10 @ 10&10 %

Stone.
Hindostan No. 1, 3¼¢; Axe, 4¼¢; Slips, 5½¢.
Sand Stone....₩ ℔, 2½¢
Washita Stone, Extra....₩ ℔, 25¢
Washita Stone, No. 1....₩ ℔, 20¢
Washita Stone, No. 2....₩ ℔, 16¢
Washita Slips, No. 1, Extra....₩ ℔, 50¢
Washita Slips, No. 1....₩ ℔, 40¢
Arkansas Stone, No. 1, 4 to 6 in....₩ ℔, $1.45@1.50
Arkansas Stone, No. 1, 6 to 9 in....₩ ℔, $1.75
Turkey Oil Stone, Chase....4 to 8 in., ₩ ℔, 60¢
Turkey Slips, Chase....₩ ℔, $2.00
Lake Superior....₩ ℔, 17¢
Lake Superior Slips....₩ ℔, 31@32¢

Stove Boards.
Buffalo Zinc, S. S. & Co....dis 50 %

Stove Polish.
Joseph Dixon's....₩ gro $6.00, dis 10 %
Gem....₩ gro $4.50, dis 10 %
Gold Medal....₩ gro $6.00, dis 25 %
"Mirror"....₩ gro $6.00, dis — %
Lustro....₩ gro $4.75 net
Ruby....₩ gro $3.75 net
Rising Sun....₩ gro $5.75 net
Dixon's Plumbago....₩ ℔ 8¢ net
Boynton's Noon Day, ₩ gro....$5.00

Tacks, Brads, &c.
List, Sept. 1, 1882, and supplement, Jan. 1, 1886.
American Iron Carpet Tacks, all kinds....dis 55 %
Steel Carpet Tacks, all kinds....dis 50 %
Swedes Iron Carpet Tacks all kinds....dis 50 %
Swedes Iron Tacks....dis 50 %
Swedes Iron Upholsterers' Tacks....dis 50 %
Tinned Swedes Iron Tacks....dis 50 %
Tin'd Swedes Iron Upholsterers' Tacks....dis 50 %
American Iron Cut Tacks....dis 50 %
Copper Tacks....dis 50 %
Copper Finishing and Trunk Nails....dis 50 %
Cigar Box Nails....dis 45 %
Finishing Nails....dis 45 %
Hungarian Nails and Miners' Tacks....dis 35 %
Gimp and Lace Tacks....dis 45 %
Tinned Gimp and Lace Tacks....dis 45 %
Trunk and Clout Nails....dis 37½ %
Tinned Trunk and Clout Nails....dis 37½ %
Basket Nails....dis 37½ %
Chair Nails....dis 37½ %
Common and Patent Brads....dis 40 %
Tinned Capped Trunk Nails....dis 30 %
Looking-Glass Tacks....dis 25 %
Picture-Frame Points....dis 25 %
Leathered Carpet Tacks....dis 25 %
Brush Tacks....dis 25 %
Shoe Finders'....List Jan. 1, 1886
Lining and Saddle Nails....List Jan. 1, 1886
(All Lining and Saddle Nails extra 10&2 %, others extra 10&10&2 %.)
Double-pointed Tacks....dis 80 %
Wire Carpet Nails....dis 50 %
Wire Carpet Nails, R. & E. Mfg. Co....dis 50 %
Steel Wire Brads, R. & E. Mfg. Co....dis 50 %

Tap Borers.
Common and Ring....dis 20&10 %
Ives' Tap Borers....Nos. 1, 2, 4—dis 15&10 %
Ives' Tap Borers....Nos. 13, 14—dis 25&10 %
Enterprise Mfg. Co....dis 20&10 %
Clark's....dis 33⅓ @ 35 %

Tapes, Measuring.
American....dis 25&10 %
Spring....dis 40 %
Chesterman's....Regular list dis 25 @ 30 %

Thermometers.
Tin Case....dis 80 @ 80&10 %

Ties, Bale.
Steel Wire, Standard list....dis 50&10 %

Tinners' Shears, &c.
Shears and Snips (P. S. & W.)....dis 20 @ 25 %
Punches—See Punches.
Snips, J. Mallinson & Co....dis 33⅓ %

Tinware.
Stamped, Japanned and Pieced, Central Stamping Co....dis 30&2 @ — %
Pieced, S. S. & Co....dis 60 %
Japanned, S. S. & Co....dis 25&10 %
Stamped, S. S. & Co....dis 30&2 @ — %
(Extras sometimes given.)

Tobacco Cutters.
Enterprise Mfg. Co. (Champion)....dis 20&10 @ 30 %
Wood Bottom....₩ doz $5.00 @ $5.25
All Iron....₩ doz $4.25
Nashua Lock Co.'s....₩ doz $18.00, dis 50 @ 55 %
Wilson's....dis 55 %
Clipper (Sargent & Co.)....₩ doz $24, dis 50&10&10 %
Acme....₩ doz $20.00, dis 40 %

Transom Lifters
Wollensak's Patent Iron Bronzed....dis 50 %
Reiher's Improved Self-Locking (Class 301)....dis 40 %
Reiher's Improved Set Screw (Class 201)....dis 45 %
Reiher's (Class 101)....dis 50&10 %
Excelsior....dis 50&10&2 %
Shaw's....dis 45&10 %

Traps.
Game—
Newhouse....dis 35 %
Oneida Pattern....dis 60&10&10 @ 60&10&10&5 %
Game, Blake's Patent....dis 40&10&5 %
Mouse and Rat—
Mouse, Wood, Choker....₩ doz holes, 15¢
Mouse, Round Wire....₩ doz $1.50, dis 10 %
Mouse, Cage, Wire....₩ doz $2.50, dis 10 %
Mouse, Catch-'em-alive....₩ doz $2.50, dis 15 %
Mouse, "Bonanza"....₩ gross $10 net
Mouse, Delusion....₩ gross $18.00, dis 15 %
Rat, "Decoy"....₩ gross $10.00, dis 10 %
Ideal....₩ gross $10
Cyclone....₩ gross $5.25

Trowels
Lothrops' Brick and Plastering....dis 20&10
Reed's Brick and Plastering....dis 15 %
Disston's Brick and Plastering....dis 20&10 %
Peace's Plastering....dis 25 %
Clement & Maynard's....dis 20 %
Rose's Brick....dis 15 @ 20 %
Brade's Brick....dis 25 %
Worrall's Brick and Plastering....dis 20 %
Garden....dis 70 %

Triers.
Butter and Cheese....dis 25 %

Trucks, Warehouse, &c.
Penfield Block Co.'s list, 1882....dis 40 %

Tubes, Boiler.—See Pipe.

Twine.

	BC.	b.
No. 9, Flax Twine, ¼ and ½ ℔ Balls	24¢	31¢
No. 12, " " ¼ and ½ "	22¢	24¢
No. 18, " " ¼ and ½ "	20¢	22¢
No. 24, " " ¼ and ½ "	20¢	22¢
No. 36, " " ¼ and ½ "	19¢	21¢

No. 264, Mattrass, ¼ and ½....50¢
Chalk Line, Cotton, ½ ℔ Balls....28¢
Mason Line, Linen, ½ "....60¢
2-Ply Hemp, ¼ and ½ ℔ Balls (Spring Twine)....14½¢
3-Ply Hemp, 1 ℔ Balls....15¢
3-Ply Hemp, 1½ ℔ Balls....13¢
Cotton Wrapping, 5 Balls to ℔....14¢ @ 20¢
2, 3, 4 and 5 Ply Jute, ½ ℔ Balls....11¢
Wool....6¢ @ 6½¢
Paper....13¢ @ 14¢
Cotton Mops—6, 9, 12 and 15 ℔ to doz....17¢

Vises.
Solid Box....dis 50&10 @ 60 %
Parallel—
Fisher & Norris Double Screw....dis 15&10 %
Stephens'....dis 25 %
Parker's....dis 20 @ 25 %
Wilson's....dis 55 %
Howard's....dis 40 %
Bonney's....dis 40 %
Millers Falls....dis 40 @ 40&10 %
Trenton....dis 40&5 @ 40&10 %
Merrill's....dis 15@20 %
Sargent's....dis 60&10&10 %
Backus and Union....dis 40 %
Double Screw Leg....dis 15&10 %
Prentiss....dis 25 @ 25&5 %
Simpson's Adjustable....dis 40 %
Saw Filers—
Bonney's, Nos. 2 & 3....₩ doz $15.00, dis 40 %
Stearn's....dis 40 %
Sargent's....dis 60&10&10 %
Hopkins'....₩ doz $17.50, dis 10 %
Reading....dis 37½&10 %
Wentworth....dis 20&10 %
Cowell Hand Vises....dis 20 %
Bauer's Pipe Vises....dis 10 %

Wagon Boxes.
Per lb....2½¢

Washer Cutters.
Smith's Patent....₩ doz $12.00, dis 20&10&10 %
Johnson's....₩ doz $11.00, dis 33⅓ %
Penny's....₩ doz Pol. $14; Jap'd, $16..dis 55 %
Appleton's....₩ doz $16.00, dis 60&10 %
Bonney's....dis 30&10 %

Washers.—See Nuts and Washers.

Wedges.
Iron....₩ ℔ 3¼¢
Steel....₩ ℔ 3¾¢

Well Buckets, Galvanized.
Hill's....₩ doz., 12 qt., $3.50; 14 qt., $4.50
Iron Clad....₩ doz., 14 qt., $8—dis
Whiting's Flat Iron Band....₩ doz $4.25
Whiting's Wired Top....₩ doz $4.00

Well Wheels—8 in., $1.85; 10 in., $2.15; 12 in., $2.90

Wire
Brass and Copper, new list, Jan. 18, '84..dis 33⅓@30&10 %
Iron—
Market, Bright and Annealed, Nos. 0 to 18....dis 70 %
Market, Coppered, Nos. 0 to 18....dis 65&5 %
Market, Galvanized, Nos. 0 to 18....dis 60&5 %
Market, Tinned, Tinned list, Nos. 0 to 18...dis 60&5 %
Stone Bright and Annealed, Nos. 16 to 18....dis 65 %
Stone, Bright and Annealed, Nos. 19 to 26....dis 67½ %
Stone, Bright and Annealed, Nos. 27 to 36...dis 72½ %
Stone, Galvanized, Nos. 19 to 30....dis 50&10 %
Stone, Tinned, Tinned list, Nos. 18 to 36....dis 60 %
Tinned Broom Wire, Nos. 18 to 24....dis 60 %
Annealed Fence, Nos. 8 & 9....dis 65 %
Annealed Grape, Nos. 10 to 14....dis 65 %
Barb Fence....See Trade Report
Wire on Spools....dis 65 %
Malin's Spld. Wire, 1 ℔, ½ ℔ & ¼ ℔ sp'ls..dis 50&10&5 %
Cast Steel Wire....dis 50 %
Stubs' Steel Wire....$6.00 to £, dis 30 %
Steel Music Wire, Nos. 12 to 30....55¢ ₩ ℔
Picture Wire....dis 60&10 %
Barb Wire Safety Guards....₩ 1000 $9.00, dis 25 %
Wire Clothes Lines. See Lines.

Wire Cloth.
Screen, drab and black, ₩ 100 sq. ft....$1.90@$2.00

Wire Goods.—See Bright Wire Goods.

Wrenches.—American Adjustable....dis 45 %
Baxter's Adjustable "S"....dis 35&10 %
Baxter's Diagonal....dis 35&10 %
Coes' Genuine....cash in 10 days, dis 60&3 %
Coes' "Mechanics'"....dis 60&10&3 %
Coes' Pattern, Malleable....dis 80&5 %
Coes' Pattern, Wrought....dis 80 @ 80&5 %
Girard Standard....dis 70 @ 70&5 %
Girard Agricultural....dis 80 %
Sterling Wrench, Wrought....dis 80 @ 80&5 %
Sterling Wrench, Malleable....dis 80 @ 80&10 %
Bemis & Call's Patent Combination....dis 30&5 %
Bemis & Call's Merrick's Pattern....dis 35 %
Bemis & Call's Brigg's Pattern....dis 25 %
Bemis & Call's Cylinder or Gas Pipe....dis 40&5 %
Bemis & Call's No. 3 Pipe....dis 35&5 %
Aiken's Pocket (Bright)....$6.00, dis 50&10 %
The Favorite Pocket (Bright)....₩ doz $4.00, dis 40 %
Webster's Patent Combination....dis 25 %
Boardman's....dis 25@25&10 %
Always Ready....dis 25&5 %
Alligator....dis 40&10 %
Donohue's Engineer....dis 25 %
Acme, Bright....dis 60&3 %
Acme, Nickeled....dis 45 %
Acme, Bicycle, 4½ in....dis 45 %

Wringers.

	Per doz.
Adams & Co. No. 8	$30.00
Advance	30.00
Excelsior, for Stationary Tubs, No. E, 10-inch	39.00
Excelsior, for Stationary Tubs, No. F, 11-inch	43.50
Excelsior, with Folding Bench, No. A, 10-inch	48.00
Excelsior, with Folding Bench, No. B, 11-inch	52.50
Leader	28.00
"Metropolitan," No. 2	33.00
"Metropolitan," No. 2½	30.00
Novelty, for Common Tubs, No. 2, 10-inch	30.00
Novelty, for Common Tubs, No. 3, 11-inch	34.50
No. 99 Improved 2½	30.00
Peerless No. 2½	30.00
Peerless No. 3½	34.50
Universal, No. 2½	30.00
Universal, No. 2	33.00
Universal, No. 1¼	34.50
Universal, No. 1½	39.00
Universal, No. 1	57.00
Universal, for Set Tubs, A 2½	39.00
Universal, for Set Tubs, E 1½	48.00
Universal, for Set Tubs, C 1	66.00

(dis 33 @ 34 ₩ doz.)
Eureka....₩ doz $19
Am. M. Co. Wringer No. 2....$18 @ 19

Wrought Goods.
Staples, Hooks, &c....dis 80&10 @ 80&20 %

WHOLESALE METAL PRICES, March 3, 1886.

METALS.

IRON.—DUTY: Bars, 8-10¢ to 1 1-10¢ ₩ lb; provided that no Bar Iron shall pay a less rate of duty than 35 %. Sheet, 1 1-0¢ to 1 5-10¢ ₩ lb. Band, Hoop and Scroll, 1¢ to 1 4-10¢ ₩ lb. Railroad Bars weighing more than 25 lb ₩ yard, 7-10¢ of 1¢ ₩ lb.

Standard American Pig Iron.

Foundry No. 1 X	₩ ton	$18.00	@ 18.50
Foundry No. 2 X	₩ ton	17.00	@ 17.50
Gray Forge	₩ ton	16.00	@ 16.50

No. 1 Scotch Pig Iron.

Carnbroe	₩ ton		@
Coltness	₩ ton	20.50	@ 21.00
Shotts	₩ ton	20.00	@ 20.50
Glengarnock	₩ ton	19.50	@
Gartsherrie	₩ ton	20.00	@ 20.50
Langloan	₩ ton	20.50	@ 21.00
Summerlee	₩ ton	19.50	@ 20.00
Dalmellington	₩ ton	19.00	@ 19.50
Eglinton	₩ ton	18.00	@ 18.50
Clyde	₩ ton	18.50	@ 19.00

Rails.

Steel, at Eastern mills	₩ ton	$34.00	@ 34.50
Old Rails, Ts	₩ ton	21.50	@

Scrap.

Wrought, ₩ ton, from yard		$21.00	@ 21 50

Bar Iron from Store.

Common Iron: ¾ to 1 in. round and square... 1 to 6 in. x ½ to 1 in	₩ lb	1.75	@ 1.80¢
Refined Iron: ¾ to 2 in. round and square... 1 to 6 in. x ⅝ to 1 in	₩ lb	1.9	@ 2.3¢
1 to 6 in. x ½ and 5-16	₩ lb	1.95	@ 2.4¢
Rods—⅜ and 11-16 round and sq	₩ lb	1.8	@ 2.3¢
Bands—¼ to 6x3-16 to No. 12	₩ lb	2	@ 2.5¢
"Burden's Best" Iron, base price	₩ lb		2.9¢
Burden's "H. B. & S." Iron, base price	₩ lb		2.5¢
Norway Nail Rods			5 @ 6¢

Sheet Iron from Store.

	Common American.	R. G. Cleaned.
Nos. 10 to 16	₩ lb 2.70 @ 3 ¢	3½¢
17 to 20	₩ lb 3 @	3½¢
21 to 24	₩ lb 3 @	3½¢
25 and 26	₩ lb 3.12½ @	3¾¢
27	₩ lb 3.25 @	3¾¢
28	₩ lb 3.37½ @ 3.50	¢ 4 ¢
	B B.	3d qual.
Galvanized, 10 to 20	₩ lb 5 ¢	4½¢
Galvanized, 21 to 24	₩ lb 5½¢	5 ¢
Galvanized, 25 to 26	₩ lb 6 ¢	5½¢
Galvanized, 27	₩ lb 6½¢	6 ¢
Galvanized, 28	₩ lb 7 ¢	6½¢
American Russia	₩ lb A, 10¢	B, ¢
Russia	₩ lb 10 ¢	@ 10¾¢
American Cold Rolled B. B	₩ lb 5 ¢	@ 7 ¢

Iron Wire.—(*See Wire.*)

STEEL.—DUTY. Ingots, Bars, Sheets, &c., valued at 4¢ ₩ lb or less, 45 % ad. val.; valued above 4¢ and not above 7¢ ₩ lb, 2¢ ₩ lb; valued above 7¢ and not above 10¢ ₩ lb, 2¾¢ ₩ lb; valued above 10¢ ₩ lb, 3¼¢ ₩ lb. *Extras.*—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1¼¢ ₩ lb in addition to above; Steel Circular Saw Plates, 1¢ ₩ lb in addition to the above.

American Cast Steel.

For American Steel, see Pittsburgh quotations.

Chrome Steel.

Tool Steel, ordinary sizes, ⅜ to 3 inches, net	10 @	14¢
Adamantine Shoes and Dies	8 @	¢
Magnet Steel	14 @	¢

English Steel.

Best Cast	₩ lb	15	¢
Extra Cast	₩ lb	16½ @ 17	¢
Circular Saw Plates	₩ lb	14	¢
Round Machinery, Cast	₩ lb	10	¢
Swaged, Cast	₩ lb	16	¢
Best Double Shear	₩ lb	15	¢
Blister, 1st quality	₩ lb	14	¢
German Steel, Best	₩ lb	10	¢
2d quality	₩ lb	9	¢
3d quality	₩ lb	8	¢
Sheet Cast Steel, 1st quality	₩ lb	15	¢
2d quality	₩ lb	14	¢
3d quality	₩ lb	12½	¢

TIN.—DUTY Plates, Sheets, Tagger and Terne, 1¢ ₩ lb; Bars, Block and Pigs free.

Banca	₩ lb		@ 28½¢
Straits	₩ lb	21¼¢	@ 21¾¢
English	₩ lb	21¾¢	@ 22 ¢
Bar	₩ lb	22 ¢	@ 23½¢

Charcoal Tin Plates.

I C 10x14 225 sheets	₩ box	$5.25	@ 7.25
I C 12x12 225 sheets	"	5.25	@ 7.50
I C 20x28, 112 "	"	10.50	@ 14.50
I X 10x14 225 sheets	"	6.25	@ 9.25
I X 12x12 225 sheets	"	6.25	@ 9.50
I X 14x20, 112 "	"	6.25	@ 9.25
D C 13½x17 100 "	"	5.00	@ 5.50
D X 13½x17, 100 "	"	6.25	@ 7.00
For each additional X add	"	1.25	@ 2 00

Coke Tin Plates.

	Best.	Ordinary
C 10x14 } I C 14x20 }	$4.75	$4.65 @
I C 12x12	4.87½	4.75 @
I C 10x20, gutters, 225 sheets	8.00	7.25
I C 20x28, 112 sheets		10.25

Terne Plates.

	Prime Char. 2d. quality	Coke.
C 14x20 M. F.	$6.87½ @ 7.00	
I C 14x20 Old Process		$6.75
I C 20x28 "		14.00
I C 14x20	$4.75 @ 4.87½	
I X 14x20	6.25 @ 6.75	
I C 20x28	9.25 @ 9.75	8.75 @ 8.62½ @ 8.75
I X 20x28	12.75 @ 14.50	
I C 20x200	13.50 @	

Tin Boiler Plates.

XX 14x26, 2 sheets for No. 7, 112 sheets	@	$12.00
XX 14x28, 2 " " No. 8, "	@	13.00
XX 14x31, 2 " " No. 9, "	@	15.00

COPPER.—DUTY: Pig, Bar and Ingot, 4¢: Old Copper, 3¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 35 % ad valorem.

Ingot, Lake	₩ lb	11¾¢ @	12 ¢
Ingot, Baltimore	"	11 ¢ @	11½¢
Ingot Anchor	"	11¼¢ @	11½¢
Braziers' Copper and Sheathing, ordinary sizes, 16 oz. ₩ sq. ft. and over		@	18 ¢
Braziers' Copper and Sheathing, ordinary sizes, under 16 oz. and over 12 oz. ₩ sq. ft.	"	@	19 ¢
Braziers' Copper, 10 oz. and 12 oz. ₩ sq. ft.	"	@	21 ¢
Lighter than 10 oz. ₩ sq. ft.		@	23 ¢
Circles less than 84 in. in diam.	"	@	21 ¢
" 84 in. diam. and over	"	@	23 ¢
Segment and Pattern Sheets	"	@	21 ¢
Locomotive Fire-Box Sheets	"	@	18 ¢
Bolt Copper	"	@	18 ¢
Copper Bottoms, 14 oz. to sq. ft. and heavier	"	@	21 ¢
Lighter than 14 oz.	"	@	22 ¢

Tinning.

14x48, each	₩ sheet,	6¢
14x48, less than case, each	"	12¢
Boiler sizes, 7 and 8 in., each	"	12¢
Boiler sizes, 9 in., each	"	15¢
Other sizes not larger than 30x60	₩ sq. ft.,	2½¢
Larger than 30x60	"	3¢

Siver-Plated Sheet Copper for Amalgamating, price furnished upon application.

For tinning both sides, double the above amount.

O'Neill's Patent Planished Copper.—Net.

14x48

14 and 16 oz. and heavier.27¢ By the case. ₩ lb 26¢
12 oz. and lighter.....30¢ " " " 29¢

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier.29¢ By the case. ₩ lb 28¢
(And all sizes not over 20 in. wide.)

24x48 and 30x60.

14 and 16 oz. and heavier	₩ lb	31¢
2 oz	"	34¢

Planished Brass same price as Planished Copper

Copper Wire.—(*See Wire.*)

Sheathing Metal.

Yellow Sheathing Metal, ₩ lb		18¢ @

BRASS AND GERMAN SILVER.

Brown & Sharpe's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1884 ... dis. 20 @ 30 %

LEAD.—DUTY: Pig, $2 ₩ 100 lb; Old Lead, 2¢ ₩ lb; Pipe and Sheet, 3¢ ₩ lb.

Pig	5½ @ 5¼¢
Bar	5½ @ 5¾¢
Pipe	6¾¢, dis 20 %
Block Tin Pipe	40¢
Tin Lined Pipe	15¢, dis 20 %
Sheet	7¾¢, dis 20 %
Shot, ₩ bag, 25 lb	Drop, $1.46; Buck, $1.70
Chilled Shot, ₩ bag, 25 lb	$1.70

ANTIMONY.

Hallett's	₩ lb 9 @	9½¢
Cookson	" 9½ @	10½¢

SPELTER—Duty: Pigs, Bars and Plates, $1.50 ₩ 100 lbs.

American, cash	4½ ¢ @ 5¢
Bergenport	5¢

ZINC—Duty: Pig or Block, $1.50 ₩ 100 lbs. Sheet, 2½¢ ₩ lb.

600 lb casks	5.20 @ 5.30¢
Zinc.—Open	6 @ 6½¢
Zinc Tubing	dis. 10 @ 20 %

Zinc Tubing—Dis. 25 %.

Plain	.27
Fancy	.33
Scotch and Extra Patterns	.36

BABBITT METAL.

N. P. U	₩ lb 6½ @	7¢
X		10¢
X X		15¢
J. B		30¢

WIRE.

Market Wire.—Put up in 63 lb bundles.

Nos.	00 to 9,	10,	11,	12,	13,	14,	15,	16,	17,	18.
	10	11	11½	12½		14	15	16		
Bright Market Wire									dis 67½ %	
" Charcoal									dis 47½ %	
" Bale Wire, Nos. 7 to 12									dis 62½ %	
Annealed Market Wire									dis	
" Fence Wire, Nos. 8 and 9									67½ %	
" Grape Wire, Nos. 10 to 14										
Coppered Market Wire									dis. 62½ %	
" Bale Wire, Nos. 7 to 12									dis. 57½ %	
Galvanized Market Wire									dis	57 ½¢
" Fence Wire										

Stone or Weaving Wire.

Nos.	16	17	18	19	20	21	22	23	24	25	26
Cents	14	15	16	19	20	21	22	23	24	25	26
Nos.	27	28	29	30	31	32	33	34	35	36	..
Cents	28	29	30	32	33	35	37	40	45	55	..

Nos. 16 to 18	dis. 70 @	70 %
" 19 to 26	"	70 %
" 27 to 36	" 75 @	75 %
Galvanized Stone Wire	"	50 %

Steel Wire.

Cast Steel, Steel Wire list	dis. 50 %

Brass and Copper Wire.

Old English Gauge the Standard.—Dis 20 @ 25.

	Common High Brass	Low Brass	Gilding Bronze and Copper.
All Nos. to No. 16, inclusive	$0.22	$0.26	$0.30
No. 17 and 18	.23	.27	.31
" 19 and 20	.24	.28	.32
" 21	.25	.29	.33
" 22	.26	.30	.34
" 23	.28	.32	.36
" 24	.30	.34	.38
" 25	.32	.36	.40
" 26	.35	.39	.43
" 27	.38	.42	.46
" 28	.42	.46	.51
" 29	.45	.49	.54
" 30	.48	.52	.62
" 31	.51	.55	.67
" 32	.55	.59	.73
" 33	.59	.63	.82
" 34	.64	.68	.95
" 35	.70	.74	1.30
" 36	.76	.80	1.50
" 37	1.00	1.04	1.70
" 38	1.30	1.34	2.00
" 39	2.00	2.00	3.25
" 40	2.60	2.60	5.75

Spring Wire, 2 cents per pound advance. Whitened Wire, 3 cents per pound advance. Flat, Square and Half-Round Wire, 4 cents advance on Round Wire. Fancy Wire, not less than 10 cents advance on Round Wire. Spooling on one-pound Spools, 12 cents per pound extra. Spooling on ten-pound Spools or more, 2 cents per pound extra.

MISCELLANEOUS TINNERS' STOCK.

Solder.

½ & ⅓, Warranted	14½ @	14½¢
Extra	13¼ @	13½¢
No. 1 Refined	11½ @	12 ¢
No. 2 Solder	11 @	11½¢
Extra wiping	11 @	11½¢

Rivets.

Iron and Tinned, new list, Dec. 10, 1881	dis. 50 %
In bulk, new list, Dec. 10, 1881	dis. 45 %
Copper Rivets and Burrs	dis. 50&10@60 %

Nos..	7	8	9	10	11	12	13	14	1
₩ lb..	49¢	50¢	52¢	54¢	56¢	58¢	60¢	65¢	70¢

Stove Bolts.

American Screw Co.'s	dis. 65 %
R. B. & W	dis.
R. & E. Mfg. Co	dis. 70 %

FRENCH GLASS.

August 20, 1885. Per Box, 50 feet.

Single Thick.

Sizes.	1st. E F H	2d. I E H	3d. H H	4th. H B
25 6 x 8 to 10 x 15	$11.50	$10.50	$10.00	$9.50
40 11 x 14 to 16 x 24	13.00	12.25	11.50	10.75
50 18 x 22 to 20 x 30	17.00	16.00	14.50	13.25
54 15 x 36 to 24 x 30	19.00	17.00	15.00	
60 26 x 28 to 24 x 36	20.00	18.50	16.25	
70 26 x 36 to 26 x 44	21.50	20.00	16.50	
80 26 x 46 to 30 x 50	23.50	22.00	19.00	
84 30 x 52 to 30 x 54	25.00	23.00	20.00	
90 30 x 56 to 34 x 56	26.00	24.00	22.00	
94 34 x 58 to 34 x 60	27.50	26.00	23.50	
100 36 x 60 to 40 x 60	31.00	28.00	26.00	

Double Thick.

Sizes.	1st. E F H D	2d. I E H D	3d. H H D	4th. H B D
25 6 x 8 to 10 x 15	$14.00	$13.50	$13.00	$12.25
40 11 x 14 to 16 x 24	17.00	16.00	15.25	14.50
50 18 x 22 to 20 x 30	22.00	20.50	19.00	
54 15 x 36 to 24 x 30	24.00	22.00	20.00	
60 26 x 28 to 24 x 36	26.00	24.00	21.75	
70 26 x 36 to 26 x 44	27.50	26.00	22.50	
80 26 x 46 to 30 x 50	30.00	28.00	24.50	
84 30 x 52 to 30 x 54	31.50	29.00	26.00	
90 30 x 56 to 34 x 56	33.00	30.50	28.00	
94 34 x 58 to 34 x 60	35.00	34.00	31.00	
100 36 x 60 to 40 x 60	38.00	36.00	34.00	

Sizes above—$15 per box extra for every 5 inches. Discount 80 @ 80&10 %.

PAPER STOCK, &c.

(*Dealers' Selling Prices.*)

	Cents ₩ lb.
White Shirt Cuttings, No. 1	6¾ @ 7
" " No. 2	6¼ @ 6
Mill Assorted Whites	5 @ 5½
Unbleached Muslins	5¾ @ 6
City Whites No. 1	2¼ @
City Whites, No. 2	2¼ @ 2¾
New Canton Flannels	4½ @ 4¾
New Seconds, light	3¾ @ 4
" dark	2¾ @ 3
Cotton Canvas	4½ @ 4¾
Linen Canvas No. 1	4 @ 4½
Seconds, City No. 1	1¾ @ 1¾
Seconds, City No. 2	1 @ 1¼
Colors, ₩ cwt	40 @ 50
Manila Rope	3 @ 3½
Tarred	2¾ @ 2¾
Gunny Bagging, No. 1	1¾ @ 1¾
" No. 2	1¼ @ 1¾
Kentucky Bagging	4 @
Burlap Bagging, No. 1	1¾ @ 2
Tar Shakings	1¾ @ 2
Hemp Twine Stock	3¼ @ 3¾
Hard White Shavings, No. 1	3½ @ 4
Soft White Shavings, No. 1	2¾ @ 3
White Shavings, No. 2, Soft	2½ @ 2¾
Mixed Shavings part White	2¾ @ 2¾
Ledger and Writing	2¾ @ 2¾
Solid Stock	2¼ @ 2¼
Book Stock, No. 1, light	1½ @ 1½
Old Newspapers	1¼ @ 1¼
Pure Manilas	1¾ @
B gus Manilas and Hardwares, cwt	60 @ 100
Commons, ₩ 100 lb	40 @ 60
Binders' Board Cuttings	½ @ ¾
Straw Board Cuttings, ₩ cwt	60 @ 70

PAINTS, OILS, &c.

Paints.

Black, Lamp—Coach Painters'	₩ lb 22 @	24¢
" Ordinary		6¢
Black Ivory Drop, fair	12 @	13¢
" best		25¢
Black Paint, in oil	kegs, 8¢; assorted cans, 11¢	
Blue, Prussian, fair to best	40 @	55¢
" " in oil	45 @	55¢
" Chinese dry		70¢
" Ultramarine	18 @	30¢
Brown, Spanish	10 @	12¢
" Van Dyke		
Dryers, Patent American	asst'd cans, 9¢; kegs, 7¢	
Green Chrome	15 @	23¢
" in oil	14 @ 18 @	25¢
" Paris	good, 20¢; best, 25¢	
" " in oil	good, 30¢; best, 35¢	
Iron Paint, Bright Red	₩ lb	2½¢
" Brown	"	1½¢
" Purple	"	3¢
Ground in oil, Bright Red	"	6½¢
" " Red	"	5½¢
" " Brown	"	5½¢
" " Purple	"	6¢
Litharge		6½¢
Mineral Paints	2 @	4¢
Orange Mineral		10¢
Red Lead American		6½¢
Venetian (Eng.) dry	$1.65 @	$1.70
" in oil	asst'd cans, 11¢; kegs, 8¢	
" Indian Dry	9 @	12¢
Rose Pink	10 @	13
Sienna, American Raw, powdered		4¢
" Burnt, powdered		4½¢
" " in oil	10 @ 16 @	20¢
" Raw	11 @ 15 @	25¢
Umber, Burnt, powdered	4 @	8¢
" in oil	9 @ 12 @	15¢
" Raw, powdered	4 @	7½¢
" in oil	9 @ 12 @	15¢
Vermilion, Chinese	10 @	90¢
" English	53 @	58¢
" American, Common		15¢
White Lead, American, pure dry		6¢
" " " in oil	7 @	7½¢
White Paris, English Prime	2 @	2½¢
Yellow Ochre, French		$1.75
" " in oil asst'd cans, 11¢; kegs, 8¢		
" Vermont	in casks,	1½¢
Yellow Chrome	17 @	27¢
" in oil	14 @ 18 @	20¢
Zinc White, American No. 1, dry		5 @ 6¢
" " No. 1, in oil		7¢
" French (Paris Dry)	5½ @	7½¢
" in oil	10 @	11¢

Oils.

Bleached Whale, ₩ gal	52 @	53¢
" Sperm, ₩ gal	93¢ @	$1
" Elephant, ₩ gal		38¢
Drilling		40¢
B. & R. Best Valvone Cylinder		70¢
Engine		50¢
Fish Oil, Pressed	32 @	34¢
Lard, Prime Winter	52 @	53¢
" No. 1 Extra		49¢
Linseed, Raw, in casks and bbls	44 @	45¢
" Boiled, " "	48 @	49¢
" Western, " "	42 @	43¢
Calcutta		49¢
Machinery		40¢
Miners' Oil	85 @	45¢
Neatsfoot	60 @	70¢
Signal		50¢
Tallow		58¢
West Virginia	11 @	18¢

Sundries.

Asphaltum, Cuban, ₩ lb	5½ @	6¼¢
" Egyptian	8 @	9½¢
Benzine	₩ gal. 8½ @	9½¢
Chalk, ₩ 100 lb		45¢
" Block		75¢
Crucibles No. 14 and upward, per number		35¢
Grain Emery, 300 lb kegs	3¾ @	4¢
Flour Emery, finest quality		2½¢
Frostings		40¢
Glue, White	24 ₩	35¢
" Sheet		20¢
Glaziers' Points, Zinc, ₩ box		$4.75
Gum, Copal		30¢
" Damar		25¢
" Shellac, English		30¢
" " dark		25¢
Mineral Wool, ordinary, ₩ lb	1 @	1¼¢
" extra	3 @	3½¢
Pumice Stone, selected Lumps	3 @	6¢
" powdered	2¾ @	3¼
Pine Tar, bbls	$2.25 @	$2.50
Pitch		$1.50
Plumbago E. I. Po., ₩ lb	4 @	6¢
" American, ₩ lb	6 @	10¢
" Gun Powder Glazing, ₩ lb		10¢
" Shot Polish ₩ lb		10¢
Putty, in bladders		2½¢
" in bulk	1¾ @	2
Rosin—Common and Good—Strained		$1.55
" E & F	$1.40 @	$1.70
" G & H	$1.90 @	$2.25
" I & K	$3.25 @	$3.75
" M & N	$4.75 @	$5.50
Spirits Turpentine, ₩ bbl	43½ @	49½¢
Stove Polish, Dixon's, ₩ gross		$5.50
" Rising Sun	"	4.00
" Gem	"	3.00
" Jet Black		9¢
Waste, No. 1 Cop		9¢
" No. 1 White Machine		8½¢
" No. 2 White Machine		6½¢
" No. 1 Colored		6¢
" No. 2 Colored		5¼¢
" Washed Machine		60¢
Whiting, Spanish, ₩ 100 lb		

Hardware Novelties.

Marchand's Self-Measuring Oil Pump.

We present below a perspective and sectional view of Marchand's Self-Measuring Oil Pump, just put on the market by Marchand Novelty Co., 28 and 30 West Broadway, New York. The pump is used for drawing oil from a barrel, tank or other reservoir. At the lower end of the pipe is a check-valve, shown at 19, Fig, 2, which is brought down to within ½ inch of the bottom of the tank or barrel. The oil is measured by the pump direct, as each time the piston is raised an amount of oil equal to the capacity of the cylinder below the piston is drawn up. By the next stroke of the piston-

Marchand's Self-Measuring Oil Pump.
Fig. 1.—Perspective View.

the oil is raised into the drum which surmounts the cylinder, and from which it is carried away through the pipe shown at the top of the drum in Fig. 1. The peculiar feature of this pump, to which the manufacturers particularly direct attention, is the mechanism through which the piston is attached. To the rotating handle 1, Fig. 2, is fastened the journal 5, furnished with an eccentric hole into which fits a small crank-axle, 6. Motion is transmitted from the crank-axle to the piston by the connecting-rod 7. The condition necessary to the maximum stroke is that the crank-pin of 6 be furthest from the center of the journal 5. The crank-axle is jammed in position by means of the set-screw 2. In adjusting the pump to measure, the set-screw 2 is first loosened and then handle 1 revolved a fraction of a turn. The set-screw is then tightened and the pump tried with a measure; should the first adjusting not give the right quantity the above operation is repeated until it is found, on trial, that each stroke of the pump throws the desired amount of oil. The normal throw of the pump is ½ pint for each turn of the handle. By the ratchet attachment shown in Fig. 1 the handle may be altered so as to bring it in the most convenient position for pumping. Another feature of this pump referred to by the manufacturers is the valve 19, which is made double, so as to lessen the danger of it becoming clogged. The pump is supported on a stand, as shown, and has a drip-tray below the spout. The supply and drip pipes pass through holes in the floor beneath and enter the oil tank or barrel. The pump is used for measuring kerosene oil, benzine, turpentine, machine and other oils. Should any part of the pump get broken or lost, it can be replaced by the manufacturer, as all parts are made in duplicate. The pump is also made in cabinet form.

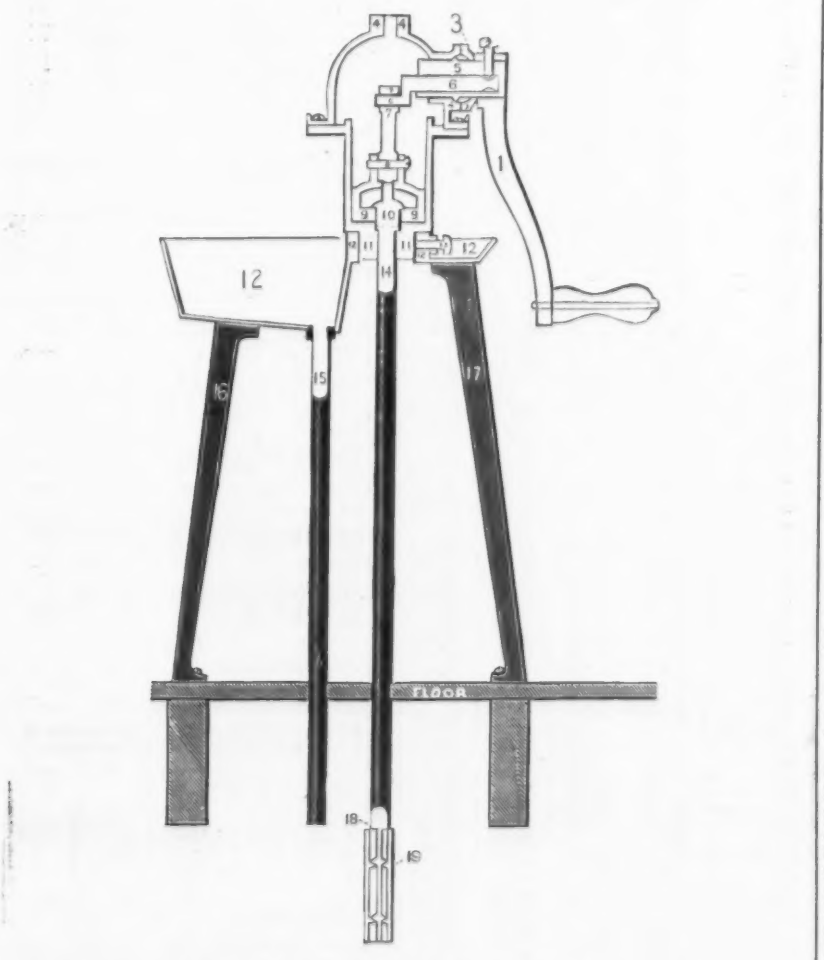

Fig. 2.—Sectional View of Marchand's Pump.

The Maud S. Currycomb.

The illustration which we give herewith represents the Maud S. currycomb, which is manufactured by the Ayers & Decker Mfg Co., Keokuk, Iowa. From the cut it will be perceived that this is a combination wire and bar currycomb, made in the form represented. The wire side is intended for use on the legs and bony parts of the horse, and is referred to as especially adapted for cleaning a horse brush by rubbing it over the face of the brush. Its efficiency in removing dry mud, sweat or dirt of any kind is also alluded to. The comb is described as

The Maud S. Currycomb.

well made, with malleable frame, steel bars and steel wires which are well stretched and securely fastened. It is made with wooden handles, as represented in the cut, with open or close back, and also with ring handles, open or close back.

Dean's Patent Tubular Hand Truck.

Dean Brothers, Indianapolis, Ind., are making the tubular hand truck thus named, the construction and special features of which are described below. It will be perceived that the truck is made entirely of iron, the frame being constructed of oval tubes riveted together, as indicated in the accompanying illustrations. The general appearance of the truck is represented in Fig. 1, while a side view through the center of cross-bars is given in Fig. 2. At the angle

Dean's Patent Tubular Hand Truck.—Fig. 1.—General View of Truck.

allude to their advantages over the wooden trucks as being in their greater strength, without additional weight, and in their durability from the material of which they are made, the frames not being liable to shrink, swell, check or break.

Fig. 2.—Sectional Side View.

Fig. 3.—Section of Tube.

INDUSTRIAL ITEMS.

MAINE.

The Bangor Edge Tool Co., Bangor, are just putting into their establishment a 100-horse-power high-speed engine.

NEW HAMPSHIRE.

The Nashua Shuttle and Bobbin Co., Nashua, have lately received orders from New Jersey.

MASSACHUSETTS.

The Holyoke Machine Co., of Worcester, have recently received orders for their Hercules water-wheels from the following firms: Friend & Fox Paper Co., Lockland, Ohio, three wheels; Putnam Water Works, Putnam, Conn.; Woodville Water Works, Woodville, N. H., two wheels; Denison Paper Mfg. Co., Mechanics' Falls, Me.; E. W. Chapin, Northboro, Mass., two wheels; Mt. Holly Paper Co., Mt. Holly Springs, Pa.; Josiah Perry, Webster, Mass.; Beckett, Lourie & Co., Hamilton, Ohio; Wm. M. Mooney & Co., Montreal, Canada; John Turnbull, Jr., Glasgow, Scotland, three wheels; Pepperell Mfg. Co., Biddeford, Me.; A. W. Ogilvie & Co., Montreal, Canada, five wheels; Tarbell & Harris, Willimantic, Conn.; Hope Co., Hope, R. I.; Agawam Paper Co., Mittineague, Mass.

The Douglass Axe Co., East Douglass, are preparing to build an addition to one of their shops for a new set of rolls which they have recently purchased. They are also repairing a small shop that has not been in operation the past year, which it is intended to start soon.

PENNSYLVANIA.

Among recent electric light customers, the Westinghouse Machine Co., of Pittsburgh, report: Portsmouth, Ohio, 60 horse-power; J. C. Reagan, Omaha, 60 horse-power (third order); Kuhn & Bro. and T. C. Jenkins, Pittsburgh, each 35 horse-power; Adams Express Co., Philadelphia, 25 horse-power; Des Moines Electric Light Co., Moberly, Mo., four of 60 horse-power each; Moberly Electric Light Co., Moberly, Mo., two of 45 horse-power; Annheuser Busch Brewing Co., St. Louis, Mo., 100 horse-power; Windsor Hotel, New York, 60 horse-power; Thomson-Houston Electric Light Co., Raleigh, N. C., 60 horse-power; Town of Union Silk Mill (second order), Union Hill, N. J., 60 horse-power; Allegheny Electric Light Co, (ninth and tenth orders), Pittsburgh, two 75 horse-power; Jas. Doak, Jr., & Co. Worsted Mills, Philadelphia, Pa., one 45 and one 15 horse-power.

The blast furnace of the Charter Rolling Mill Co., which has been out of blast for the past 18 months, blew in again this week.

Sharpsville Furnace (coke), in the Shenango Valley, chilled last week and was blown out.

No. 6 Furnace of the Thomas Iron Co., at Hokendauqua, after undergoing a thorough overhauling, was put in blast last week.

No. 5 Furnace of the Pennsylvania Steel Co., at Steelton, blew in on Friday, the 19th ult.

Isaac Pott & Co., boiler-makers, Lebanon, are engaged in erecting a large foundry to their boiler works. It is to be finished about March 15.

The Swatara Furnace Co., of Harrisburg, were chartered at the State Department on the 18th ult., with a capital of $20,000.

The employees of the Bird Coleman, North Cornwall, Donaghmore and Robesonia furnaces (anthracite), in the Schuylkill Valley, have had their wages advanced 10 per cent., taking effect on the 1st inst.

Keystone Furnace No. 2, at Reading which chilled several weeks ago, blew in again on the 27th ult.

NEW JERSEY.

The employees of the Warren Foundry and Machine Co., in Phillipsburg, have been notified that their wages will be advanced 15 per cent. on March 15. This establishment employs about 400 men.

PITTSBURGH AND VICINITY.

Messrs. Totten & Co., Pittsburgh, report having in hand the following orders, which certainly indicates an improved condition in the way of rolling-mill machinery: One 20-inch Universal mill for Brown, Bonnell & Co., Youngstown; one 20-inch Universal mill for Everson, Hammond & Co., Pittsburgh; one complete 22-inch three-high nail-plate train, specially adapted for steel-nail plate, for the Co-operative Belleville Steel and Iron Nail Co., Belleville, Ill.; one same size with improvement of Mr. John B. Hastings, an experienced nail-plate roller, of Ironton, Ohio, for the Wellston Steel and Nail Co., Wellston, Ohio; one 22-inch sheet mill complete, with 30-ton fly-wheel, main shaft, &c., for W. H. Everson & Co., of Scottdale, Pa.; one large-size squeezer for Graff, Bennett & Co.; 12-inch train chill and sand rolls for I. Harris & Co., of St. Johns, N. B.; one 12 x 24 Forster crusher for crushing talc, and one 5 x 15 ditto for Colorado.

Hussey, Howe & Co., of Pittsburgh, commenced making steel last week in their new 20-ton open-hearth furnace, which they have just completed and which occupies the site of their old 10-ton furnace.

Miller, Metcalf & Parkin, of the Crescent Steel Works; Park, Brother & Co., of the Black Diamond Steel Works, and William Clark & Co., of the Solar Iron Works, are considering the advisability of laying a natural-gas pipe to the Murraysville field for their own use. These firms are at present paying the Philadelphia Co. $75,000 per year for gas.

The employees of the Allegheny car shops, on the Ft. Wayne Railroad, are at work upon an order for 350 gondola cars.

Soho Furnace, the property of Moorhead, McClean & Co., which has been out of blast for some time making repairs, blew in again on Thursday, the 25th ult.

Work was begun last week at excavating the foundations for the Pittsburgh Tube Works, which company were recently organized in Pittsburgh. The works will be completed by July 1, and will employ 500 men.

MISSOURI.

The St. Louis Stamping Co. have 1000 tons of German soft steel ordered, which will be delivered shortly and rolled into sheets and plates at their mill in North St. Louis.

The machine shop of the St. Louis Vise Tool Co., on North Tenth street, was burned Friday morning. Loss $4000, fully covered by insurance. There will be no interruption in the business of the company on account of the fire. Orders will be attended to as usual.

The Smith, Beggs & Ranken Machine Co., of St. Louis, shipped two or three carloads of machinery to the Sheridan Mining Co., in New Mexico, last week, and will complete their large contract with that company about March 10. Among the engines they now have under way are three aggregating from 600 to 650 horse power for the Tudor Iron Works, in East St. Louis, to be in connection with other machinery for increasing capacity; also a large engine for Southern Illinois.

ILLINOIS.

The Climax Filling Spring Co., to manufacture chair irons with springs, were incorporated at Chicago last week, with a capital stock of $10,000.

WISCONSIN.

The Lake City Tool Co. have accepted favorable propositions made them by the citizens of Brooklyn and removed their works from Beloit to that place, changing their title to the Duplex Wind Mill Co.

Messrs. E. P. Allis & Co., of Milwaukee, have issued the following: "We hereby respectfully give notice that under Letters of Patent No. 330,720, dated the 17th day of November, 1885, we hold the exclusive right to manufacture, use and vend a combined laterally-shiftable sawmill carriage. The following are claims 8 and 9 under this patent: '8.—In a sawmill, the combination of a saw, a fixed track by the side thereof, and a series of trucks or their equivalents along the track and occupying a fixed position transversely thereon, of a log-supporting frame mounted on said trucks, and a hand-lever pivotally connected with the frame and connected with the trucks, whereby the frame may be moved upon the trucks transversely to the line of travel of the carriage. 9.—In combination with a track and a saw at the side thereof, a sawmill carriage having its trucks mounted upon said track, and a log-frame movable upon said trucks transversely to the line of travel of the carriage, and a lever connecting the movable frame and trucks and adapted to be controlled by the operator or attendant, substantially as explained, whereby the log-frame may be shifted upon the trucks independently of the feed mechanism.' Our attention has been directed to recent attempts of certain manufacturers to copy our device and infringe upon our claims. We are therefore compelled to give notice that we shall protect our patent and prosecute all such infringements to the fullest extent of the law."

MICHIGAN.

Messrs. Byram & Co., of Detroit, are now making a Colliau cupola furnace for Los Angeles, Cal., and have just received an order for the second cupola from the Jackson & Woodin Mfg. Co., of Berwick, Pa.

OHIO.

The Thomas Perfection Ornamental Fence Co. have been incorporated at Alton, to manufacture and sell the Thompson Perfection ornamental fence; capital stock, $10,000; incorporators, C. P. Frye, S. Patis and C. P. Stanton.

Nearly all the blast furnaces through the Mahoning Valley, which were banked by reason of the coke strike, have resumed operations, running partly on coal until a full supply of coke can be secured.

The Cummer Engine Co., of Cleveland, have just received orders for a 215-horse-power engine for the Peninsular Car Works, of Detroit, Mich., and for a 55-horse-power engine for the Cleveland Machine Co. They have also just shipped one of their 170-horse-power engines to G. W. Straight, of Chicago, Ill. The company are now designing plans for a small automatic engine which will range in sizes from 15 to 50 horse-power. They have secured the sole right from the patentee for the manufacture and sale of these engines in the United States and Territories during the term of the patent. They say they are to have fewer parts than any other small engine in the market, and that crucial tests have been made with the engine, showing it to have a high economy in the consumption of steam. The company are now putting in special machinery with a view to building them on an extensive scale, and expect to have them on the market in a very short time. The Cummer Engine Co. are also now building a smaller size of the Jonathan Mills universal flour dresser to meet demands where a smaller reel will answer the requirements. They report that these reels are rapidly gaining favor.

Schulein & Wannenmacher, of Ottville, have put a new Westinghouse engine into their flour mill.

The Roller Chain Belting Co., of Columbus, builders of elevating and conveying machinery, are running their works night and day, 10 hours each, principally on their coal mining machinery, viz., the Legg coal mining machine and rotary power coal drills.

The Bucyrus Foundry and Mfg. Co., of Bucyrus, report a satisfactory state of trade. Inquiries for their steam shovels, dredges and railway supplies in general are frequent. Within the last 10 days they shipped one of their steam shovels to San Francisco, and will ship others in a short time.

The Spaulding Iron Co., of Brilliant, have withdrawn from the Western Nail Association and signed the compromise scale which was signed by the Junction Iron Co. last week. The scale is the same as that signed by the Junction, so far as the rate for cutting nails is concerned, but for heating 67½ cents per ton is to be paid, coal furnaces being used. The Junction scale was 63 cents per ton, gas furnaces being used.

Decisive action looking to the settlement of the affairs of Brown, Bonnell & Co. was taken by Judge Baxter last week.

Jefferson Furnace (charcoal), in the Hanging Rock district, which has been out of blast for some time, will blow in next week.

TENNESSEE.

The stockholders of the Roane Iron Works, Chattanooga, after being in session several days, have adjourned. They have under consideration the conversion of the works into a steel plant, provided the experiments with their ores are successful.

TEXAS.

The Marshall Foundry and Wheel Factory has closed a contract with the receivers of the Texas and Pacific Railroad Co. to supply the road and its branches with car-wheels and all castings.

NORTH CAROLINA.

Raleigh is to be lighted by the Thomson-Houston light, backed by a Westinghouse engine.

The Mecklenburg Iron Works, of Charlotte, have just completed and started a 10-stamp battery, with power and attachments, for the Horne and Bartrum Gold Mine, near Asheboro.

WEST VIRGINIA.

The Wheeling Steel Works, Wheeling, have just started a 250 light incandescent plant on the Westinghouse system.

VIRGINIA.

The Roanoke Machine Works, of Roanoke, are filled with orders, and are running on full time in both locomotive and car departments.

ALABAMA.

The Southern Bridge Co., at Birmingham, put their works in operation on the 27th ult.

The Talladega and Coosa Valley Railroad are pushing their extension to Broken Arrow, to connect with the East and West Railroad.

The Birmingham City Council has granted the application for new gas works on condition that gas be supplied to private consumers at not more than $2 and to public institutions at not more than $1.50 per 1000 feet.

Exports.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the port of New York, for the week ending March 2, 1886:

	Quan.	Val.
Dutch West Indies.		
Clocks, cs....	2	22
Hdw., cs.... ..	10	149
Copper, case..	1	36
Nails, cs.....	4	53
Hamburg.		
Hdw. pkgs...	378	6,017
Sew. ma., cs..	1301	26,508
Mach'y, pkgs.	189	6,829
Firearms, cs..	6	470
Mf'd steel, cse	1	25
Saws, cs	6	222
Nails, cs.....	2	48
Pumps, pkgs.	19	1,056
S. rollers, cs..	10	225
Ag. imp..pkgs	1521	20,485
Clocks, pkgs..	62	1,485
Mf. iron,pkgs.	6	68
Pritg. presses, cs.....	4	500
Nickel matte, bbls.....	50	4,500
Bremen.		
Hdw., cs.....	6	250
Ag. imp.,pkgs	7	420
Mf. iron, pkgs	42	115
Brass goods, case...	1	35
Sew. ma., cs..	2	36
Christiania.		
Sew. ma., cs..	10	341
Leith.		
Ag. imp.,pkgs	2	64
Liverpool.		
Clocks, cs.....	797	16,466
Guns, case....	1	80
Lamp stoves, pkgs	99	485
Sew. ma., case	1	22
Mach'y, pkgs.	21	1,477
Nails, kegs....	101	241
Zinc, bbls....	50	450
Hdw., pkgs...	90	4,236
Ag.imp.,pkgs.	51	1,900
M. rollers.....	5250	1,900
Pumps, pkge.	1	15
Brass sprinklers, cs	17	1,075
Antwerp.		
Mach'y, pkgs.	2	714
Ag.imp., pkgs	63	2,825
Hull.		
Ag. imp., pkgs	316	12,875
Pumps, pkgs.	3	207
Bordeaux.		
Sew. ma., cs..	49	1,704
Mach'y, pkgs.	42	8,164
Ag. imp.,pkgs	1163	21,275
Glasgow.		
Cartridges, cs	2	155
Clocks, bxs...	32	437
Iron pipe, pcs	82	307
Hdw., pkgs...	17	445
Sew. ma., cs..	28	5,022
Ox. zinc, bbls.	50	766
Mach'y, pkgs.	4	80
Mf. iron, pkgs	13	1,300
Marseilles.		
Ag.imp., pkgs	88	6,900
London.		
Mach'y, pkgs.	37	2,486
Hdw., pkgs..	305	6,319
Pumps, pkgs..	6	188
Spelter, slabs.	9391	29,400
Revolvers, cs..	2	1,100
Brass goods, case	1	68
Sew. ma., cs..	190	8,977
Wringers, cs..	20	480
Lead, pigs....	30	83
Saws, cs.....	2	28
Antimony, cs.	400	3,000
Copper, cks..	2	250
Ag. imps.,pgs.	256	3,335
Corset wire, bbls.....	5	389
Nails, cs.....	47	711
Mf. iron, pkgs	5	54
Iron drums...	40	350
Cartridges, cs	18	433
Carbines, cse.	1	49
Scales, case..	1	75
Clocks, pkgs..	129	8,026
British Guiana.		
Mach'y, pkgs.	4	263
Nails, kegs....	6	21
Trieste.		
Ag.imp., pkgs	3	315
British West Indies.		
Firearms, cs..	2	68
Hdw. pkgs....	22	430
Steam pump.	1	156
Mf. iron, pkgs	64	265
Cartridges, cs	21	338
Nails, kegs...	29	83
New Zealand.		
Hdw., pkgs...	468	5,731
Wringers, cs..	8	92
Pumps, pkgs.	7	295
Ag.imp., pkgs	49	850
Tinware, cs..	6	90
Clocks, cs.....	9	221
Tacks, cs.....	13	250
Sew. ma., cs..	37	370
Nails, cs	52	1,280
Air guns, cs..	2	47
Mf. iron, pkgs	699	3,327
Rifles, cs....	3	150
Naples.		
Hdw., cs.....	12	322
Canada.		
Mf. steel, cs..	2	353
Havre.		
Mach'y, pkgs.	20	1,275
Hdw., pkgs...	19	228
Ag. imp.,pkgs	2850	56,821
Copper, cakes	448	6,800
Sew. ma., cs.	266	3,239
French West Indies.		
Lightning rods cs.....	2	150
Oporto.		
Arms, cs.....	3	72
Hdw., cs.. ...	17	314
Cartridges, cs	4	41
Clocks, cs.....	69	654
Cuba.		
Saws, cs.....	3	40
Boilers... ...	2	2,350
Railroad cars.	6	1,200
Railroad matl, pkgs.....	15	280
Sew. ma., cs..	20	2,253
Scales, cs.....	22	579
Tacks, cs.....	14	190
Nails, cs.....	5	35
Pumps, pkgs.	2	90
Spikes, kegs..	30	195
Mach'y, pkgs.	278	5,434
Hdw., pkgs...	90	1,372
Cutlery, cs....	28	421
Tinware, cs..	13	288
Clocks, pkgs..	6	153
Ag. imp.,pkgs	24	1,015
Locomotive...	1	3,715
Nails, kegs...	213	582
Copper, pkgs.	3	72
Cartrid'g's, cse	1	110
Mf. iron, pkgs	445	2,597
Mexico.		
Hdw., pkgs...	122	1,361
Mach'y, pkgs.	85	6,657
Sew ma., cs..	25	447
Saw.....	1	46
Cartridges, cs	9	458
Shot, bags....	40	322
Tacks, cs.....	5	25
Tin plate, bxs	85	178
Clocks.....	1	57
Primers, cs...	2	27
Tinware, cs...	14	137
Per. caps, cs..	3	128
Plumbg. mat., cs.....	10	188
Ag.imp.,pkgs.	6	25
Mf. iron, pkgs	276	1,245
Cutlery, cs...	36	816
Mf. steel, cs..	4	45
Pistols, case..	1	516
Tinfoil, case..	1	19
Iron, pkgs....	51	98
Pumps, pkgs.	5	196
Zinc, cks	3	33
Nails, kegs...	42	136
Arms, case...	1	438
Valves, cs....	2	51
Saws, case....	1	50
Venezuela.		
Hdw., pkgs...	62	630
S. iron, bdls..	92	928
Saws cs.....	3	49
Mach'y, pkgs.	2	122
Cutlery, cs...	2	117
Ag.imp., pkgs	4	48
Mf. iron, pkge	1	60
United States of Colombia.		
Mf. iron, pkgs	273	2,500
Hdw., pkgs...	47	1,428
Mach'y, pkgs.	17	377
Cutlery, cs...	29	693
Br. goods, cs.	2	677
Water-closets, pkgs.....	5	192
Iron, pkgs....	372	767
Boats.....	3	378
Sew. ma., cs..	12	156
Shot, bags...	40	240
Clocks, cs. ...	16	353
Nails, kegs...	38	103
Yellow metal case.....	1	66
Zinc, drums..	3	178
Lead, pkgs...	2	76
Pump.....	1	2,750
Tinware, cs...	26	480
Lead pipe, lbs.. 19,660		924
S. w. apparatus, cs.....	6	201
Pumps, pkgs.	3	232
Revolvers, cs.	2	305
Guns, case ...	1	165
Hayti.		
Mf. iron, pkgs	2	73
Hdw., cs.....	5	133
Mach'y, pkgs.	7	268
Cotton gin....	1	57
Genoa.		
Old cop., cs...	2	65
Ag. imp.,pkgs	3	70
Clock matl, cs	6	124
Mach'y, pkgs.	23	3,850
Tinware, cs..	3	119
Hdw., cs.....	3	45
Brazil.		
Mf. iron, pkgs	10	460
Ag.imp., pkgs	8	150
San Domingo.		
Sew. ma., cs..	9	168
Hdw., cs	3	20

CONTENTS.

American Institute of Mining Engineers.

THE PITTSBURGH MEETING.

Thursday Morning's Session.

Thursday evening being set apart for the usual subscription dinner, there were no general excursions provided for, a piece of thoughtfulness on the part of the local committee for which the visiting members were duly grateful. Some of the visitors strayed away on personally-conducted tours to the works in which they were particularly interested, but the majority attended the sessions, at which were developed quite a discussion of the Clapp-Griffiths steel.

The first paper of the session was on "The Mining Compass and Trigonometer," by Erich G. Gaertner, New York City, which awakened some interest among the members engaged in mining.

The second paper was by Mr. James P. Witherow, of Pittsburgh, on

THE CLAPP-GRIFFITHS SOFT STEEL PROCESS, ITS DEVELOPMENT AND VALUE.

Early in 1882 Mr. Thomas Griffiths, engineer in charge of experiments for Messrs. Gilchrist & Thomas, had it brought to his mind that a small pneumatic steel converter could be constructed, using mild blast and small quantities of metal, which would produce a quality of steel superior to that of ordinary Bessemer. Working upon this hypothesis, he conceived the plan of using tuyeres in the side of the vessel as a means of reducing the pressure of blast required Further investigation showed the advantages due to tapping off the slag during the intermediate stages of the blow. Applying for patents, he discovered that Dr. Clapp, of Nantyglow, Wales, had already some that stood in his way. A combination of interests was effected and the experiments jointly continued. As I have stated in a previous paper to this Institute, their first experiments were conducted at a tin-plate works near Newport, Monmouthshire; afterward a small converter was erected at the works of the Messrs. Conway. There Mr. H. W. Oliver, Jr., and myself saw it in successful operation in the summer of 1883.

The value of the process and the excellent quality of the material produced made a deep impression upon us, although the plant and its surroundings had anything but an inviting aspect. Like most of the other iron men and engineers, we might have been disposed to infer that the process was merely a poor imitation of the old Swedish stationary converters, if this impression had not been immediately dispelled by following up the ingots into the mill and watching their manipulation into plate of the most superior quality and having a welding property seldom possessed by pneumatic steel. We immediately concluded that in this unpretending process lay the germ of a boon to the iron masters of the United States that the future only could unfold, and that the vexed questions of boiling and puddling which have defied them all for years would shortly be settled forever. Fully convinced, we decided immediately to negotiate for the purchase of these patents. This consummated, Mr. Oliver sailed for home, and within 60 days had commenced the building of their plant.

It is unnecessary here to go into a detailed description of the Welsh plants. Suffice it to say that Mr. Oliver determined to adhere closely to their arrangements and details, using their plans for his own, crude as they were, thereby entailing on his original plant an excessive cost of manufacture and little security for permanent or successful work. At the very commencement of operations great trouble was encountered with the linings and tuyeres, it being impossible to make more than one or two blows without stopping to patch the lining or replace the tuyeres, this occasioning long delays, as the lower section of the converter could not be detached. After hastily condemning the refractories used and waiting for months for others to come from Wales, further experiments only convinced us that the American refractories were by far the best. This question settled, new difficulties arose in the handling of the output, and better facilities for this were furnished. Even these additions did not give entire satisfaction, and in the fall of 1884 we were convinced that only a remodeling of the whole plant would assure commercial success. Viewed from our own standpoint this conviction had been impressed upon us for months, and during November, 1884, Messrs. Oliver Bros. & Phillips instructed us to proceed at once with the remodeling. Hampered by the existing buildings, the position and levels of cupolas, ladles, scales and other parts of the plant, the remodeling could not be as radical as desired The winter and spring of 1885 thus wore on with the plant idle, and the very few faithful friends to our efforts were almost discouraged, the trade seeming to see nothing but a complete failure.

The year or more of practical experience demonstrated that the construction of the Welsh converter was fatally defective. Built in undetachable segments, it necessitates a tedious and costly delay to put in a patch or replace a single tuyere block. Hence new vessels with movable bottoms were at once decided upon, and arrangements for handling, making up and drying them followed in direct sequence. A system of hydraulic jacks and cranes was put in; the complicated tuyere plugs, with their differential pistons and air connections, dispensed with; simple and effective means for controlling the blast invented, patented and adopted, and the whole arrangement as seen completed. The beginning of continuous working dictated further improvement. Natural gas furnished convenient means for the thorough drying of the bottoms, which has enabled some to stand 89 heats, far beyond the best practice elsewhere. A greater cupola capacity—even yet below the requirements—has assisted the production of a larger output, the number of blows per ton ranging from 40 to 50, giving on double turn from 130 to 150 tons per 24 hours. This large product cannot be kept up, as the facilities at Messrs. Oliver Bros. & Phillips' mill are inadequate to take care of it. For the future the erection of a blooming mill gives promise that the converting department can be run to its maximum capacity with, of course, a correspondingly increased economy.

In the new plants extensive alterations and improvements have been adopted. The inconvenience of having the converters on an elevated platform has been remedied by the adoption of the casting-pit. Cumbersome tipping iron ladles have been superseded by convenient and powerful ladle cranes furnished with the most modern appliances for charging and weighing. The swinging track for the steel ladle has been replaced by a casting crane revolving in a pit, following the best experience of the Bessemer engineers. Ingot cranes for comfortable and rapid handling of the product are furnished of modern type and ample power. The engines, pumps and other machinery are all placed in a separate building—out of the dirt and heat of the converting-house. New and improved designs have been adopted wherever consistent with the best judgment and greatest experience.

The plant of the Glasgow Iron Co., at Pottstown, Pa., we refer to as the most modern type of Clapp-Griffits works, where the designing is not hampered by local circumstances or necessary connections with existing machinery and mills. The complete plant is contained in two buildings of very moderate size, the iron converting-house being 120 feet long by 50 feet wide, while the engines, boilers and ovens are covered by a structure 100 x 40 feet, the engine-house brick and the rest iron. Ample yard room is provided by placing the small building some 60 feet from the converting-house, the drying ovens standing opposite the converters, hence allowing rapid and convenient transfer of the hot bottoms. Through this yard runs a track for the delivery of the raw materials, elevated enough to reduce rehandling to a minimum. While claiming for the engine and boiler house nothing further than a convenient and well-adapted arrangement, we would call to more particular notice several features of the converting works, some quite novel, facilitating therein the working as well as the handling of the material.

Taking up the cupolas, each is fitted with two filling doors, on a level with the charging platform, so placed that the radiation of heat therefrom is directed to the corners and sides of the charging floor, thus exposing the fillers as little as possible and yet making it convenient to use side-dumping wheelbarrows. For protection and economy of floor space the charging scales are placed below ground. Over their platform is placed a neatly fitting plate-iron guard which also incloses and protects the stand upon which the charging ladle rests to be filled and weighed. When ready this ladle is lifted from its stand by the charging crane, swung around to position in the rear of the converter, raised till the hooks on the tipping bars are engaged, then by the further raising of the crane and racking out the horizontal harness the contents of the ladle are rapidly and completely emptied into the converter, the lift of the crane being adjusted so that its extreme limit is reached before any dangerous stress is set up in the hooks. As the crane is required only a portion of the time for handling the ladle and performing the charging operation just described, it has been also fitted up to assist in handling the converter bottoms, for which it is very conveniently located, although the bottom for either converter may be readily attached and removed without its use. The jib of this crane has, therefore, two buggies, the one nearest the outer end supporting a heavy and well braced vertical harness, terminating in two massive ladle hooks. A horizontal harness leads back from this to the mast, where it is supported and actuated by a pair of racks and pinions that are operated by a large hand-wheel conveniently accessible from a platform fastened to the mast and turning with it. The travel of the buggy, together with the swing of the vertical harness, give the ladle a movement of a little more than 5 feet. To the second buggy a hanger is attached supplied with a yoke fitted to carry a vessel bottom, the crane having lift enough to conveniently transfer a bottom from one car to another, and by a connection between the horizontal harness and the hanger a rotary motion can be given to the bottom while suspended, thus facilitating its adjustment upon the car.

For raising and lowering the bottoms each converter stands over a powerful hydraulic jack with its ram provided with a turn-table head. Rising through the car this head receives the bottom and allows it to be freely revolved as desired. The bottom when detached is placed upon its car, and need not be removed until again presented to the converter. The handle to the valve for working this jack is placed in the recess of the converter housing, where, while perfectly protected, it is always at the hand of the bottom man when engaged in setting or withdrawing a bottom. In like manner the handle of the valve operating the charging crane is placed in a location from which the various functions of that crane may be best observed—that is to say, between the converters and just back of the ladle crane. Here the operator is out of the way, but still has a perfect view of the work he is called upon to perform. In the arrangement of the casting-pit and in the design of the casting and ingot cranes the most approved practice found in the modern Bessemer plant has been followed or adapted to meet the special requirements. And it should be noted that all is so harmoniously arranged that, with the 100 to 150 tons of metal passing through the works daily, not a pound of it, after charging the cupola, has to be lifted by the human hand.

The plant of the Western Nail Co., of Belleville, Ill., of which Gen. W. H. Powell, is president, we are gratified to report has been completed and is now in full and successful operation, the first of the modern series. At Port Henry the Witherbee plant is finished and starts this week. At Pottsville and Pottstown two others are nearing completion, the former of which will commence operations this week. Three more are progressing: For Col. Henry McCormick, at Harrisburg; the Lickdale Iron Co., at Lebanon, and the E. & G. Brooke Iron Co., at Birdsboro. This number of plants actually under way goes far to show that the ironmasters of this country are awakening to the fact that this process offers unexceptional advantages.

In regard to the use of small ingots, those wishing them for nail slabs, say 50 inches long by from 13 inches to 16 inches wide by 5 inches thick, can rest assured that they can be economically made, as shown by example of the Western Nail Co.'s practice to-day. Smaller ingots in like manner can undoubtedly be produced; if, however, the maximum capacity of the plant is desired, it will be found more economical to use regular 10 or 12 inch molds, provided the mechanical appliances for their manipulation constitute a part of the plant. Dealing with 2 to 3 tons per blow, this process avoids many of the objections urged by Bessemer men against small ingots, and we think the question practically solved for nail mills using from 50 to 80 tons of steel per day. Furthermore, the experience that General Powell has already had at the Western Nail Co.'s plant fully establishes the fact that but trifling and inexpensive alterations are necessary in most nail mills to enable them to fully utilize this process.

Turning now to its commercial value, its large output from a comparatively small plant places it far in the lead of the open-hearth, with which at least double the original outlay would be required for the same production. With the Bessemer works using large vessels we can make no comparison, but believe that the peculiar arrangement of our converter with mild blast and side tuyeres possesses special economical advantages that can hardly be approached by the use of small Bessemer vessels with bottom tuyeres and high pressures. Furthermore, the large and constantly growing demand for soft steel in bars and structural shapes makes it imperative that rolling-mill men should be prepared to meet it, and from the ir own plants. In aiding existing mills to make this addition our process offers special advantages; the component parts are light and easily arranged, and the space required so small that many mills could put in a steel annex with hardly a change except the tearing out of a few puddling furnaces. In addition to this we unhesitatingly claim that we can fully duplicate whatever measure of economy or efficiency is gained by the Bessemer in working direct from the blast furnace, and a special availability follows in the addition of the Clapp-Griffiths process to existing furnace plants, where existing shelter, power and management can be all most economically adapted to place on the market a product double its former value with an extra cost of not over $4 per ton. Granting this, is there an ironmaster in the country who can afford to be insensible or indifferent to the future thus foreshadowed for our manufacturing supremacy?

The figures for our statement of cost are taken from Mr. H. W. Oliver's work during the past six months, although the production at present only averages a little over 100 tons per 25 hours, which is as much as the mill can take care of, and is not near the actual converting capacity, which should be with 2-ton vessels about 150, and with the 3-ton vessels about 225, tons per 24 hours. The following table gives a comprehensive statement of a typical week's work:

Report of Operations Oliver Bros. & Phillips' Converting Department, Week Ending February 6, 1886.

Date.	Turns.	No. of blows.	Materials charged, pounds. Pig.	Scrap.	Coke.	Lime stone.	Ferro.	Pounds steel produced.	Bottoms used.
Monday ..... Feb. 1..	Day	42	123,620	16,300	.....	.....	.....	122,400	.....
Monday ..... Feb. 1..	Night..	44	125,970	17,810	.....	.....	.....	124,650	.....
Tuesday ..... Feb. 2..	Day....	39	123,750	6,875	.....	.....	.....	120,900	.....
Tuesday ..... Feb. 2..	Night..	41	128,500	23,325	.....	.....	.....	120,400	.....
Wednesday... Feb. 3..	Day....	42	130,900	15,825	.....	.....	.....	125,580	.....
Wednesday... Feb. 3..	Night..	45	134,300	18,225	.....	.....	.....	137,250	.....
Thursday..... Feb. 4..	Day....	42	124,100	15,500	.....	.....	.....	124,740	.....
Thursday ..... Feb. 4..	Night..	41	124,800	22,325	.....	.....	.....	120,540	.....
Friday ..... Feb. 5..	Day....	44	127,500	18,275	.....	.....	.....	129,800	.....
Friday ..... Feb. 5..	Night..	50	144,500	15,700	.....	.....	.....	149,000	.....
Saturday..... Feb. 6..	Day....	31	66,300	12,250	.....	.....	.....	92,850	.....
Total.....	.....	461	1,364,240	182,310	193,300	38,665	17,012	1,378,110	7

Total metal charged	1,546,550 pounds
Total steel produced	1,378,110 pounds
Loss in converting (11 per cent.)	168,440 pounds
Number of blows made	461
Number of bottoms used (average blows per bottom, 65 8-10)	7

Summary of Cost Based on Bessemer Pig, 0.12 Phos.

	Total cost.	Per ton steel.
Pig metal, as above ..... 679.04 tons, at $18.00	$10,962.72	$19.80
Scrap, as above ..... 81.34 tons, at 15.00	1,220.10	
Coke, as above ..... 96.65 tons, at 2.00	193.30	.32
Limestone, as above ..... 17.25 tons, at 1.00	17.25	.03
Ferro, as above ..... 7.60 tons, at 72.50	551.00	.90
Fuel for steam, drying bottoms, ladles, &c	48.00	.07
Material for repairing bottoms, ladles and cupolas, (ganister and fire-clay)	115.30	.19
Maintenance of ingot molds	63.50	.10
Labor, including superintendent, chemist, maintenance of plant and general repairs; also, all material and delivery of ingots to rolling mill	968.70	1.57
Total	$14,139.87	$22.98

Steel produced, 615.23 gross tons. Average cost per ton		$22.98
Per cent. of pig metal charged	88 2-10	
Per cent. of scrap metal charged	11 8-10	

Basing the cost of above week's operation on pig metal containing 0.3 phosphorus, which produces steel admirably adapted for nails, heavy hardware, tank plates, sheets, &c., the results would be as follows:

1 11-100 tons pig metal, at $15.00	$16.50
Other items as above	3.18
Cost of steel per gross ton	$19.68

Of course in a plant of the more modern type improved machinery will cut down the labor required. The figures given above we think convincing, and we have no hesitation in maintaining (and this year's work with the new plants will put it beyond the shadow of a doubt) that the total cost of conversion per ton is less than that of the most economical Bessemer works in this country, leaving entirely out of the question the interest on the original investment, which, of course, is heavily in our favor. Furthermore, the main question is not so much the cost as the quality, and we claim the special advantage that steel of a superior quality can be and is daily made from stock much of which would not be bought and could not be used by the most reckless Bessemer or open-hearth management. In other words, we firmly believe and shall endeavor to prove that pig metal bought $3 per ton cheaper than the Bessemer, and put through the Clapp-Griffiths converter, can be made into steel and worked up into nails and many of the miscellaneous forms under which merchantable steel is sold in the United States to-day with a large profit to the producer and perfect satisfaction to the consumer. Such a broad assertion as this requires substantiation by facts and figures, and should be sustained by evidence in two directions: First, the results of experiment with physical tests confirmed by analysis; second, by the commercial results of every-day practice.

The plant of the Mes rs. Oliver Bros. & Phillips, the only one in operation until last month, has not been available for any further experiments since those of Capt. R. W. Hunt, who so ably laid his results before you at the Chattanooga meeting last May. Hence we quote from that paper some of his results and deductions. These analyses and tests were carefully made and in some cases the determinations were duplicated by different chemists and we believe them entirely trustworthy. We quote from his paper as follows:

"During the time I was at the works of Messrs. Oliver Bros. & Phillips I saw some 130 or more heats of steel made from their regular mixture of iron. Most of these I also saw rolled both from the ingots into billets and from the billets into subsequent commercial products. The greater proportion was reduced from 8-inch ingots into billets on a 20-inch muck-bar train, using the regular Gothic grooves, the remainder on a 16-inch mill. I can only say that I never saw soft steel roll equal to it, and I think the many steel experts who witnessed with me the rolling of this metal will indorse my statement. From the steel alluded to I did not see a single cracked ingot. I cannot say bloom, because the ingots are at once rolled into billets, and, even in the highest phosphorus stuff, as the ingots became reduced to billets the racks either pulled out, closed up or disappeared in some other manner to an extent beyond anticipation."

As to the use of high-phosphorus irons he says: "I am fully convinced that for nails and many other purposes steel can be used to advantage which contains up to 0.55 per cent. of phosphorus. I do not think a metal with so great an amount of phosphorus would answer to put on the market for general purposes; but where it is to be manufactured into specialties to which it is adapted it can be profitably used. I can assure the Institute that I saw some very surprising results in the working up of the high-phosphorus steel made by me during these last trials. As before stated, it was all utilized."

Others have also made practical tests on this question. We cite the experience of Col. Henry McCormick, of the Paxton Mills, at Harrisburg, who sent out his own pig metal, containing about 0.4 of 1 per cent. of phosphorus, in care of his superintendent, Mr. Denny, had it converted, the ingots on analysis showing from the three heats 0.37, 0.44 and 0.34 of 1 per cent. of phosphorus, and we quote from his letter to Captain Hunt, further sustained by one published in *The Iron Age*, as follows: "The Clapp-Griffiths ingots turned up on Thursday. Tried one of each heat, breaking down first into nail slabs 12 x 12 x 2 inches, then rolling into nail plate and cutting into nails. Under treatment it behaved like mild Bessemer slabs (only softer) that we have been working. It lost 1 per cent. in weight in heating furnace from slab to plate (usual loss steel). In nails it stood the tests of driving as well as average of Bessemer steel nails made from Pennsylvania Steel Co.'s or Homestead (Pittsburgh) slabs. No appreciable difference in slabs tried from the three heats. We did not give any extra annealing, but just submitted them to regular treatment. We will go on and try the other ingots next week and roll some tank plate. If any different behavior develops, will advise you."

For further evidence on this question as to commercial results we cite the short but entirely satisfactory experience of General Powell at the Western Nail Co's. plant, as shown by various letters from him: "Our new Clapp-Griffiths plant is developing a grand result, and our entire system is working up to our fullest expectations as to quality of steel ingots and plate, heating and rolling throughout. We are making a slab ingot 50 x 14¾ x 5½ and 5 inches, weighing 1000 pounds, top pouring; ingot strips beautifully. The same is passed through a 23½-inch three-grooved two-high train, which in three passes gives a long slab 15 x 2⅜ inches, which is cut up into suitable sections for the various sized nail plate required, steel rolling soft, edges of ingots and nail plate unsurpassed; nails A 1. We have moved out cautiously, using 75 per cent. of No. 1 Bessemer and 25 per cent. of Nos. 2 and 3 mill iron, running about 2.00 in silicon and 0.15 to 0.17 in phosphorus; results very fine; will go up in phosphorus slowly and cautiously." He then sums up by adding: "I am very much gratified over the results and the full justification of my judgment in the choice made and plans adopted."

This is certainly good evidence, written unsolicited to others than ourselves, and a few days ago in a personal interview General Powell said that these nails were equal to the best he had ever made. For other commercial results we refer you to the widely diversified character of the product of the Messrs. Oliver Bros. & Phillips mills, where this steel, high phosphorus and low phosphorus, is in daily use, and where, to the best of our knowledge, not a single ingot has ever been produced that could not be used.

We offer also the evidence of the Spang Steel and Iron Co., of this city, as follows:

PITTSBURGH, PA., January 16, 1886.

Messrs. Oliver Bros. & Phillips.—GENTLEMEN: We have received from you ingots which we have rolled down to wire rod billets and disposed of as follows:

Ingots		5,134,820
To Oliver & Roberts, wire mill billets	4,784,763	
To Oliver Bros. & Phillips, crop ends	227,381	
To Oliver Bros. & Phillips, defective billets	29,120	
Loss in heating and rolling	93,556	
		5,134,820
Percentage of loss in heating and rolling		1.8 %
Percentage of loss in crop ends		4.4 %
Percentage of loss in defective billets		0.5 %

This showing we believe has never been equaled by any steel produced from any other process. In conclusion, we take as our "profession of faith" in this process the broad ground that the Clapp-Griffiths stands between the acid and basic Bessemer and alongside of and cheaper than the open-hearth for the production of soft steels of excellent quality from low-grade materials, with a smaller outlay for a plant and less cost of conversion. We wish it understood, however, that we do not claim that steel made from such low grades of iron is equal to that made from the best Bessemer stock, but when the best stock is used we are informed that the steel produced has had for a year past a market value of from $2 to $2.25 per ton above that of the Bessemer. General Powell, president of the Western Nail Co., is now in the meeting, as are also Col. Henry McCormick, of Harrisburg, and Captain Hunt, of Troy, and I have no doubt that the Institute will be pleased to hear something from these gentlemen.

At the conclusion of Mr. Witherow's paper Mr. Oliver said that he had engaged to have all his 13 trains of rolls running the next day on Clapp-Griffiths steel. The converting-house would be using Dunbar pig iron with 0.25 to 0.30 phosphorus, and making a steel that they were using continually for heavy hardware, nail plate, tank steel, fish-bars, &c., and which stood much better tests than good bar iron. In exploiting the line of using high-phosphorus pig there was no inducement in their market to go higher than 0.3, as an iron with that phosphorus could be bought at about the same per ton as the poorer grades. They were making three grades of steel: No. 1, from the lowest phosphorus pig iron obtainable, for boiler tubes, boiler plates, car links, rivets &c.; No. 2, from ordinary Western Bessemer pig, 0.10 to 0.12 phosphorus, for wire billets, sheet bars, &c.; No. 3, from what is known in that section as good all-ore mill pig, 0.25 to 0.30 phosphorus, for heavy hardware, lightning-rod, nail plate, tank plates, common sheet bars, &c.

The greatest material and commercial advantage developed by the process was the extension of the steel limit for ores. They had shown the adaptability of 70 per cent. of the Lake Superior and Iron Mountain ores to the production of steel. It was impossible to overestimate the importance of that fact. He would instance the Vermillion district, which produced a non-Bessemer ore, but which was entirely suitable for the Clapp-Griffiths process; notably the Minnesota Mine, which produced 50,000 tons the year before last, and will produce 500,000 tons during the coming year. To the above should be added the Chapin and other large producing mines in the Menominee range, the ores from which are mainly classed strictly non-Bessemer, and are sold at 25 to 30 per cent. cheaper than the standard Bessemer ores of the Lake region. Only 15 to 20 per cent. of the product of the Lake Superior mines would make a standard 0.10 phosphorus Bessemer pig. No Bessemer or Siemens-Martin plant has continually made welding steel. They occasionally made steel that would weld, but the Clapp-Griffiths converters from the day they were started made good welding steel, and nothing else, and they were using it every day for car links and chain, and supplying nearly all the manufacturers of boiler tubes with welding strips. That was a line that the Bessemer and Siemens-Martin people had, after repeated attempts, abandoned.

Gen. W. H. Powell said: I investigated thoroughly the Clapp-Griffiths process before contracting for a plant. We proceeded with its construction and made our first blow on January 21. I was astounded at the results on the first day; they were far above my expectations. I had been led by the experience of the Bessemer men to look forward to a lively time for at least a month or two in getting things into proper shape to make good steel. Our plant worked smoothly from the first day. One of the points I had to consider was handling the steel in a way to obviate the building of a large and costly blooming train. Prior to building our Clapp-Griffiths plant we were using old iron rails, faggoting them in faggots 12 inches square, about 5½ feet long, and weighing about 1000 pounds, reducing them into a slab 12½ inches wide by 2½ inches thick, in three

passes, in an ordinary slabbing muck train. I thought that I could do about the same thing in steel, after witnessing the experiments of the Messrs. Oliver. I arranged to strip the ingots while hot, and, wash heating them in a furnace I had constructed for that purpose, passed them through a slabbing train with the same housings and driving power I had for iron, but with 23½-inch rolls. The ingots were 14¾ inches wide, 5¼ inches thick and 48 to 50 inches long. I reduced these ingots to 2⅜ inches thick in three passes, and I am doing so to-day very successfully. That slab was then cut up into sections for nail plate and conveyed into another wash-heating furnace, and then rolled into nail plate, so that to-day we are rolling steel from a 14⅜ x 5¼ inches by 1000 pounds ingots as light as No. 12 wire gauge, 15 inches wide, in nine passes. If there is anything better than that in the United States I would like to hear of it.

Now I find another point, which some present may question, but which I have samples with me to prove. In this process, so far as nail plate is concerned, we have done away with the necessity for an edging groove. We do not edge our steel a particle, except that we roll in collared grooves. We cast our ingots 14¾ inches wide. The first pass in the slabbing train is 15 inches, and the slab is all made in that first groove. In the two other passes in the slabbing train and the four other passes in the nail plate roughing rolls the grooves are exactly 15 inches, and the plate is not allowed to spread a particle. The result is that we have edges on our own nail plate that cannot be excelled by any method of rolling any other metal, no matter what it may be.

As to our mixtures, we have used No. 1 Bessemer and No. 1 and No. 2 mill pig. We have made steel from No. 1 and No. 2 mill iron, 0.16 to 0.19 phosphorus, made from various Missouri ores, and it has given us as good results in every particular as the steel made from No. 1. Bessemer. The plate and the nails which are passing round the room are made from pig containing 0.14 to 0.19 phosphorus mill irons, made at Sligo Furnace and Midland Furnace, in Missouri, which irons, on account of their being unsuitable for Bessemer use, I bought for $3 per ton less than I paid for the regular Bessemer iron.

Before we started it was said we would only be able to make a soft nail which would not drive into oak plank. In that block of seasoned oak you will find, clinched, an 8d casing nail that I bent flatways to a sharp angle in a vise, and then bent the point edgeways. I then drove it through that 2 inch oak plank and clinched it on the other side. We have demonstrated that the heads will never fly off nails made of this metal, as they do incessantly off those made of Bessemer steel. As you can imagine, I am more than satisfied with the process, and more than confident of its superiority to the Bessemer for the economical production of soft steel and of nails. We will go up in phosphorus slowly and carefully.

Discussion on Mr. Witherow's paper, as well as on several treating of steel that had preceded it, was postponed until after the reading of the two subsequent papers, which also discussed steel material.

The first of these was by Mr. Wm. Kent, of New York City, on "Recent Failures in Steel Plates," and the second by Mr. Alfred E. Hunt, of the Pittsburgh Testing Laboratory, on "Soft Steel for Boiler Plates," both of which will be found elsewhere in this issue.

DISCUSSION ON STEEL.

The discussion on the several papers on steel was begun by Mr. Henry M. Howe, who said: We have listened to some very interesting remarks from several gentlemen concerning this matter, most of whom, I understand, are pecuniarily interested in the success of the Clapp-Griffiths enterprise. Replying to General Powell, who disclaimed being pecuniarily interested, I can hardly understand how a gentleman who is making steel with the Clapp Griffiths plant should not be pecuniarily interested in having it generally believed that this plant produces steel of a better quality than that produced by the ordinary Bessemer plant. I have come to Pittsburgh partly to find out about this Clapp-Griffiths matter with absolutely no interest other than a desire to arrive at the truth, and to that end have made diligent inquiries both among its promoters and among the consumers of the steel made in the Clapp-Griffiths converter. After much inquiry I confess myself wholly unable to find out what the Clapp-Griffiths process is, and I come here to ask whether there really is such a thing as the Clapp-Griffiths process. I do not say that there is no such process, although I may say that the very great majority of the large number of persons I have consulted, who are in a position to form opinions of value in the premises, are unhesitatingly and unqualifiedly of the opinion that no evidence has yet been produced to warrant the belief that such a process exists. In saying this I must expressly state that I believe that the Clapp-Griffiths enterprise has directly and indirectly done a vast amount of good. Our steel manufacturers have had it brought home to them by the work done at Messrs. Oliver Bros. & Phillips that in a cheap, small plant a large quantity of steel can be manufactured at reasonable cost and of excellent quality. The community is under a debt of gratitude to the promoters of the enterprise. Still, this fact is in itself no evidence whatsoever that there is any Clapp-Griffiths process—that is, that the operation carried on in the Clapp-Griffiths converter differs from that carried on in the ordinary Bessemer converter in kind to such an extent as to warrant us in speaking of that operation as the Clapp-Griffiths rather than as the Bessemer process. Would it not be far more reasonable to insist on calling the operation carried on in the ordinary Bessemer converter the Mushet process than to speak of that carried on in the Clapp-Griffiths converter as the Clapp-Griffiths process? Let us remember that the prodigious advances which the Bessemer process made, owing to Holley's brilliant inventions, never suggested such a thing as calling it the Holley process.

Among the original claims put forward for the Clapp-Griffiths enterprise were cheap installation and cheap working. Now I understand that these claims have been withdrawn. What remains? The claim that by removing the slag from the vessel the reduction of silicon from that slag is prevented, and that for this reason, or for some similar reason, the product approximates wrought iron in its properties, and that the presence of a given amount of phosphorus is less productive of brittleness, both hot and cold, in steel produced in the Clapp-Griffiths than in that produced in the common converter. Now, I do not deny that this is true, but I do claim that it has not been proved to be true; that the evidence offered has been utterly insignificant and wholly insufficient. I further claim that, until sufficient evidence has been offered to substantiate the claim that the Clapp-Griffiths converter removes silicon or neutralizes phosphorus or produces some similar effect to a greater degree than the common converter does, there is no justification whatsoever in speaking of the operation carried on in the Clapp-Griffiths vessel as the Clapp-Griffiths process. Until it has been proved to differ from the Bessemer process it must be called the Bessemer process. Using a Holley crane or an Allis engine or a Worthington pump in the Bessemer process does not constitute a Holley process nor an Allis nor a Worthington process.

I do not wish to split hairs, least of all when bearding the lion in his den. But I think we owe it to ourselves and to the community to challenge the right of these gentlemen to speak in our "Transactions" of their operation as a new process, and to call upon them to produce their evidence. It is at present very difficult to compare the product of the high-phosphorus product of the Clapp-Griffiths converter with similar products of the common converter, because no one about us, so far as I am aware, is making high-phosphorus steel in the common converter. But the burden of proof is on the promoters of the Clapp Griffiths cause. Let them give us not two or ten, but hundreds, of analyses of high-phosphorus steel, some made in the common converter and some in the Clapp-Griffiths. Let them at the same time give us the tensile strength and ductility tests of these steels, and let us see whether when all other conditions are equal the product of the Clapp-Griffiths vessel is superior to that of the common vessel.

Mr. Oliver stated that their competitors could only occasionally produce such steel, and that they made a great deal of bad steel, and that consumers could not use it. I would say that Mr. Oliver is misinformed as to the quality and uniformity of the steel produced by his competitors. There are two Bessemer works to my personal knowledge, and others of which I have credible information, which are producing steel of the same tenor in carbon as that produced by him with as great uniformity, and, I learn from their written statements, giving the carbon in many successive heats, with no greater proportion of cracked blooms and ingots, as I infer from personal examination of the steel in course of treatment, though I attach little importance to my own observations in this regard, as they do not cover sufficient length of time. I do attach great importance to the statements of several consumers of the product of these works, and of that of the Clapp-Griffiths plant, who inform me that they can distinguish no difference in the behavior of the two, either as regards ductility or welding or otherwise. The managers of the works I refer to are not broken down with care and overwork; they meet you smilingly; their works run on with commendable smoothness and ease. Can it be that we are to simply have the shadowy claims of the behavior and character of the metal under undefinable conditions? Are we simply to be told that it is better in ways in which its superiority cannot be reduced to tangible and directly comparable results nor expressed in figures? This would be unfortunate, for such claims are as difficult to disprove as they are to substantiate.

Mr. R. W. Hunt, of Troy, in reply, said: In view of the character of this discussion it seems to me proper that I should refer to my personal connection with the Clapp-Griffiths manner of making steel—certainly that term cannot be objected to by any one. As may be remembered by the Institute, when I first visited the Messrs. Oliver's works I was unfavorably impressed, and advised them to go slow in spending any more money on their experiment. But further investigation and observation convinced me that it possessed much greater claims for serious attention, and later my experiments, the results of which I have had the honor to present to the Institute, fully satisfied me that in the Clapp-Griffiths converter better and more uniform low-carbon metal could be produced than in the regular Bessemer practice—of course basing this opinion on my individual experience. If others have been more successful in keeping Bessemer steel absolutely uniform I can only congratulate them. As perhaps is quite well known, we make at Troy fully as great a variety of grades of Bessemer as any works in this country; and, while not wishing to talk shop, must say we are pretty well satisfied with our reputation for spring steel, gun barrels, gun frame, drop forging, dead soft, axle, machinery and a lot of other kinds of steel. Now, sir, I know that in the matter of silicon, for instance, we have varying results. In the Clapp-Griffiths metal I have always found almost absolute uniformity. Mr. Howe states that the first two great claims advanced by the Clapp-Griffiths people were cheapness of installation and low cost of product, and that both of these claims have been abandoned. So far as I am concerned, I most emphatically deny this. When I stated that from 100 to 125 tons of ingots per day could be regularly made in the Oliver plant, I was laughed at, and many of my friends told me good naturedly that I had made a mistake. The result has proved that I understated their capacity. The more complete plants of General Powell and others will do better. Now, I want to see a regular Bessemer plant put up at a cost of not over $50,000 which will do as much. As to cost of production, Mr. Oliver has permitted Mr. Witherow to give you an absolute transcript from his books. If they do not compare favorably with those of the largest Bessemer plant, let us have the figures to prove it. Perhaps I am also badly informed on this point.

Now, sir, I do not care a penny whether this Clapp-Griffiths business is a process or not. If, as has been stated to you, it permits the successful using of the cheaper non-Bessemer ores, and so helps to enrich our country, it can afford to go without a name. If the Bessemer people can use the iron made from these ores, and which they can buy for several dollars less per ton than standard Bessemer pig, why have they not been so doing? Three dollars per ton would seem to be worth saving.

Since making the experiments with the Clapp-Griffiths converter which I contributed to the Institute I have had neither time nor opportunity to continue them, and, in fact, I have felt content to await the results obtained in the several plants being built, feeling certain I would be fully sustained in all I have asserted. Part of that vindication has been offered to day by General Powell. As to the results obtained by Dr. Raymond from Bethlehem steel, I must say that I know those works make good steel, but would also ask if Dr. Raymond knows the history of Bethlehem's regular running. If our steel varies we are not compelled to use it all for one purpose. What I claim is that, based on my experience, there is less variation in the Clapp-Griffiths converter than in the Bessemer. I have never yet seen a heat spoiled in the former. Now, as to what causes the peculiar merits of the Clapp-Griffiths metal, I do not know. In my paper I asked if it might not be the uniformly low silicon. It may be something else. But I am convinced the merit is there. It remains for the chemists to determine the reason for it.

Mr. Howe answered as follows: I think that Captain Hunt misunderstands me. There is perhaps no one to whose *ipse dixit* as to the quality of steel I would bow more deferentially than to that of Captain Hunt, for whose opinion in all such matters we must all have the deepest consideration. But it is not desirable that in such a case we should simply rely on the *ipse dixit* of any man. What we want is not mere assertions backed with at most a trifling amount of evidence, but we want the evidence ourselves in detail, and plenty of it, for in such a case there can be no difficulty in producing and explaining the evidence. As to the cost of installation, I am surprised at what Captain Hunt says. I understand that the essence of the Clapp-Griffiths plant is the slag spout for running off slag during the blow, which may or may not be combined with horizontal tuyeres. About this I do not speak with positiveness, as my efforts to find out just what Clapp-Griffiths does consist in, though made with some care and patience, have thus far been somewhat unsuccessful, and I would thank the eminent gentlemen present who are promoting the cause to enlighten us.

It is true that the Clapp Griffiths vessels are actually stationary, and a stationary vessel saves the cost of a hydraulic cylinder, rack and trunnions for rotating, and that the tuyeres are situated some distance above the bottom of the bath of metal, thus permitting the use of somewhat lighter blast, and hence of cheaper engines and boilers; but, in the first place, these savings in cost are not serious, and, in the second place, they are not due to Clapp Griffiths. When I say that I do not see how a Clapp-Griffiths plant is to be much cheaper than a Bessemer plant I do not mean to compare a 2-ton Clapp-Griffiths plant with a 10-ton Bessemer plant. But I wish to compare the Clapp-Griffiths plant with a Bessemer plant of the same size and as nearly as possible resembling it without having the essential points of the Clapp-Griffiths design. Horizontal tuyeres some distance above the bottom can hardly be claimed as Clapp-Griffiths and non-Bessemer, because they were employed, as I understand, long before Clapp-Griffiths rose above the metallurgical horizon; nor for the same reason can stationary converters be so claimed. (Here, again, I do not speak positively, for I have no trustworthy information; I should be glad to be corrected.) Will Captain Hunt inform us how the attachment of a slag runner to a vessel is going to materially alter the cost of installation? Or, if I am wrong, and I profess to be in darkness as to this matter, will he kindly inform us wherein the saving in cost of installation lies between a Clapp-Griffiths plant and a Bessemer plant exactly like it, with the exception of not having those details which in themselves form the essence of the Clapp Griffiths, and which a Bessemer plant *qua* Bessemer plant cannot have.

Finally, as to silicon I am more in the dark than as to anything else. The talented advocates and promoters of the Clapp-Griffiths cause tell us that in their vessel silicon is eliminated more completely than in the common vessel. I take their figures showing the progress of the removal of silicon during the blow, and I plot from them a curve. I plot similar curves showing the rate of removal of silicon in the common vessel, and I completely fail to find any indication whatsoever that this element disappears more rapidly in one vessel than in the other. I next inquire among the Bessemer works which are making steel containing the same amount of carbon as that made in the present Clapp-Griffiths practice. I am informed by gentlemen in whose statements we all place the most complete confidence, whose veracity we cannot for an instant question—whose names I will communicate to Captain Hunt if he desires, but not to this meeting, as the information was given me somewhat confidentially—I am informed by these gentlemen that when the carbon in their steel is 0.10 per cent or less their silicon is below 0.01 per cent., and when their carbon runs from 0.10 to 0.15 the silicon is always below 0.015. At these works the average carbon is not over 0.13, and they inform me that they have never found over 0.015 per cent. silicon in steel carrying 0.10 per cent. or less of carbon; *never*—this is absolutely unqualified—and in such steel the silicon only rises as as high as 0.015 in exceptional cases. Now, Mr. President, if the common vessel takes out all the silicon, how can the Clapp-Griffiths vessel take out more than all? Will the gentlemen kindly lead us out of this perplexing dilemma and show us where the advantage of the Clapp-Griffiths vessel does lie as regards the removal of silicon? Will the gentlemen demonstrate to us that 0.01 per cent. of silicon has any appreciable effect in steel designed for purposes for which the products of the Clapp-Griffiths and the Bessemer converter are employed?

Mr. Oliver in reply said: In regard to the point that Mr. Howe raises, I wish to say a few words. There is no question but that there are some concerns, and I know the company to which he alludes, that by continual watching and incessant effort do get a good soft steel, but they have to be continually on the watch; with them it is a struggle, it is an effort, to reach the point he has named. With our plan of putting up a mill and making steel we obtain these results in a natural, easy method, without this constant effort; we make good soft steel all the time. I would suggest that the difference between the old Bessemer method and ours is somewhat similar to that between puddling iron and boiling iron. To my mind there is just as great a degree of difference. The proper way is to boil the iron. Let me say to the gentleman from Boston that the line of people that I came from, and that I have the happiness to live among, do not always consider that it makes a great deal of difference even if a man is interested in a plan or process or method. If he has shown faith by investing, his judgment in this community is taken. No matter what amount of money he may have in it, why should he induce his neighbor to make the same mistake he has made or continue to put his own money into it?

Now it has been suggested here that a small Bessemer converter be used. Now let me suggest that we have advanced from the small Bessemer converter; that the converters in England, and many of them in Germany, are still small converters. But, gentlemen, we deserve more investigation and squarer and better treatment than we have received. It is objected that this is not a process. Now, what is the meaning of the word "process"? Is it advance and progress; does it not mean to procure? That is the meaning of the word "process." Did we not advance and progress by making a stationary converter and using this our method of boiling this material? There is something in this process. I cannot tell you what, only I appeal to you to say whether if we produce continually better material we are not entitled to tack to the end of it the name "process"? I claim that any concern that has a reputation for making soft steel by the old Bessemer process at times takes up from 25 to 30 minutes, tilts the converter backward and forward, and doses it as you would a sick child, to bring the steel up to the proper point, and even then there are only one or two concerns in the country who are making soft steel. We do not say you cannot make good soft steel by the regular Bessemer process, but we do say that you do not do it continuously by that process, as we do by ours.

Now, Mr. President, I have during the past 10 years, I think, been the buyer of a larger quantity of Bessemer material than any of my neighbors, running from a few thousand tons in 1876 and 1877 continuously up until it was as high as 25,000 or 30,000 tons a year. I bought from nearly every maker; bought from all over the world. I visited the other side once or twice to find the best maker, so important was the matter to us. I say to you that lack of uniformity was the name of Bessemer steel. The best makers here change in a day, and drop off suddenly without any reason. We have a rod mill below us and are buying for it 4-inch billets from three or four different makers. We are selling our own make of billets to pretty nearly every concern around us. We are getting from $3 to $5 and $6 a ton more for the same identical size of billet than those we buy; we are getting that much more money from our neighbors for our billets and buying other billets for our rod mill at that much less. We are selling our billets at $36 where the market price of Bessemer billets has been $31 a ton. Now, is it because these people are taken with this method that they come in and pay us $3, $4 and $5 a ton more for material? Now, I hope, gentlemen, you will allow us to have that little name process. We worked a couple of years pretty hard for it, and have done something that other people did not do before, and we would like to have that name.

Mr. Howe: As regards the silicon, I respectfully wish to say an examination made by the chemist of the works referred to differs with Captain Hunt remarkably. He has handed me this statement: "We never found over 0.015 silicon in steel containing 0.10 and under of carbon, and that only in exceptional cases."

Mr. Raymond said: I desire to say one word, a frank and friendly word. The most important questions that come before us in a technical way are very likely to be questions in business. I can only express the hope that they will always be discussed with such politeness and good nature on every occasion as we have had this morning; but the gentlemen who differ will not consider themselves attacked when we make technical inquiries, when we put a technical construction on a technical statement. Now, these are purely technical inquiries. Of course the Bessemer products are made in much the larger quantities so far. Now, I think I am on the safe side in declaring I am no metallurgist if some time or other somebody don't make a bad hit with the Clapp-Griffiths. All I desire is to get at the real truth of the matter. I suppose that this is a matter for no partisan feeling whatever. And my opinion agrees with that which Captain Hunt himself expresses when he says, with that candor that characterizes him, and that eloquence that characterizes him, "I don't know."

Mr. Garrett: Will you allow me to say a word as a practical man? I understand very little chemistry, but in handling material I must candidly say that there is something very peculiar indeed in the product of the Clapp Griffith process.

Professor Egleston called attention to the fact that it is in many instances customary to treat large ingots as though they were small ones, which was a mistake. When in working any metal the outside is of a different temperature from the inside the product is subject to a series of strains that annealing but partially removes. This, he thought, was the cause of the difficulty with many plates.

Jacob Reese spoke of the effect of silicon and stated that every metallurgist knew that steel with over $\frac{1}{10}$ of 1 per cent. of silicon would not weld. Jos. D. Weeks stated that he had in his possession steel with 1.5 per cent. and over of silicon that welded perfectly.

The Panama Canal and British Commerce.

A correspondent of the London *Times* writes to that journal as follows:

To the shipping and commerce of the United Kingdom the canal across the Isthmus of Panama is perhaps not so important as to those of the United States. But it is, nevertheless, a matter of real concern, and is likely to be so in an increasing degree. If such a canal were immediately available, it would be likely to be used by us for practically all our commerce with the Pacific States of North America, and our trade with these is now represented by the respectable tonnage of over 700,000 tons a year, and by a value of nearly £9,000,000; it would be used for about one-half of our trade with Mexico, which employs 180,000 tons of shipping annually, and a declared value of about £2,500,000; and it would absorb practically the whole of our trade with Chili and Peru, which gives employment to between 500,000 and 600,000 tons of shipping, and is officially valued as worth about £9,000,000 per annum. But this, after all, is not its chief advantage to Great Britain. The many unsettled problems that still surround the question of the Suez Canal adminstration may at any time make it worth the while of England to possess yet another alternative route to her Australian colonies and the Chinese Empire. But for the existence of the Suez Canal the Panama Canal route would be a much more convenient one than any other to these countries, and so long as the Suez Canal is conducted in such a way as to make it congenial to British shipping to give it a preference it is perhaps too much to expect that vessels bound for the Australias would be likely to adopt the Panama route.

But the Suez Canal has not been administered in such a way as to give entire satisfaction to British shipping. The traffic is very frequently so seriously congested that vessels take as many days to pass through as they should take hours if the passage were perfectly free. Worse than this, the dues are very heavy, and in the recent depressed state of the freight market have been almost prohibitory. Of the total cost of transport to India, amounting to, say, 22/6 per ton, no less than 9/6 per net ton, or about 40 per cent. of the total freight, has to be paid in canal dues. Under these circumstances it is perhaps not a matter of surprise that not much more than 50 per cent. of our total imports from Asia and our Australian colonies and not more than 70 per cent. of our exports to those countries pass through the canal. The remainder is still taken by the Cape route, thus avoiding the heavy canal charges and the dangers and inconveniences of the frequent delays that are entailed by the congestion of traffic already referred to. The present value of our trade with our Australian colonies, including both imports and exports, is about £50,000,000 to £53,000,000 per annum. The Australian trade is our most rapidly increasing one, and the most hopeful and encouraging as regards the future, and it is consequently of the utmost possible consequence that it should be afforded every possible facility for development. It is, of course, by no means certain that, apart from differences of distance, greater facilities would be likely to be afforded by the one route than by the other. On the contrary, it might appear as if the fact that M. de Lesseps is the controlling spirit in both cases should lead us to expect in the Panama route a repetition of our experience in that via the Isthmus of Suez; but it is absolutely certain that our shipping interests would be benefited by a choice of routes, no matter how controlled; and it is not too much to expect that in this, as in most other cases of rival claimants for support, competition would effect a remedy for evils that conciliation has hitherto failed to cure.

C. D. Rogers, of Providence, R. I., has patented a machine for feeding nails to the dies or holders of a dial press. A sliding frame or head having separable springs actuated by jaws pivoted thereto is used in connection with means for intermittently depositing a nail within the jaws, and with a combined supporting and centering device for the nails. The loose nails are contained within a hopper having a grooved blade or pick-up that moves vertically therein and coincides with an inclined track or way which conducts the nails from the pick-up to to the way, and thence to the retaining jaws. The pick-up blade has a spring-actuated stop which prevents the nails from falling off and clogging the throat of the stationary track. The nails, regularly arranged in the channel of the blade, are retained in place until the stop engages with the stationary track, the blade continuing its upward motion to withdraw the stop and permit the nails to slide down the track until arrested.

A machine for bending metal bars and shafting has been patented by W. J. Muncaster, of Cumberland, Md. The machine comprises a bed or supporting frame, transverse frames resting upon said bed, and beams pivoted in the transverse frames and provided with rollers. Upon these rollers the shaft may be supported and rotated. A traveling press movable from end to end of the frame presses upon the shaft between the points of support. Suitable belting and gearing for imparting motion to the machine is of course provided. The patent describes a number of mechanical changes in the details of construction over the machine patented by the same inventor, June 9, 1885.

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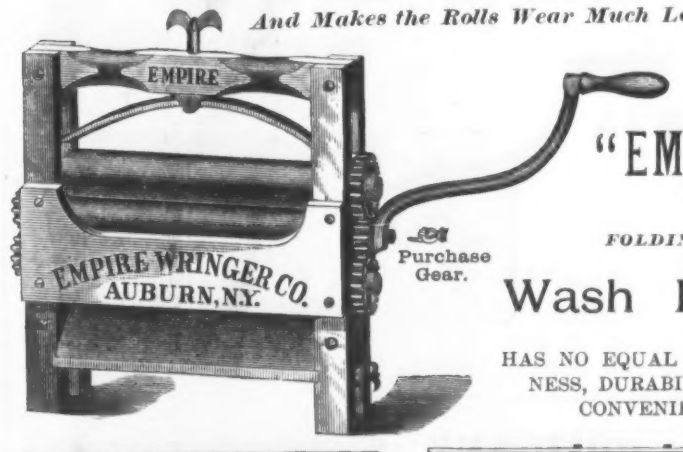

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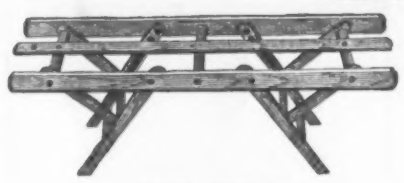

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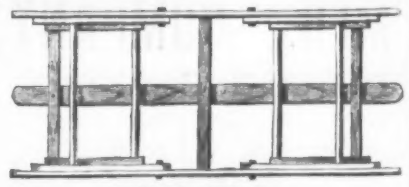

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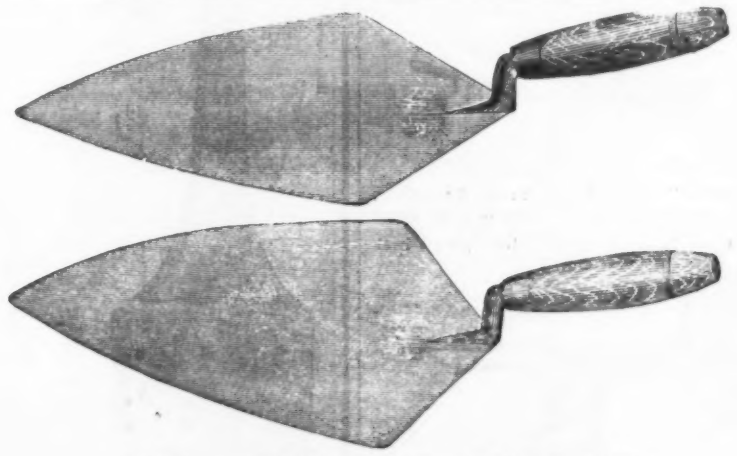

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are now well known to the trade, and we can confidently state from the severe practical tests given them that they are equal, if not superior, to the best English Trowel made. Each Trowel is carefully examined before it leaves our shop. For sale by

BRADLEY & PIERSON MFG. CO.,
298 BROADWAY, NEW YORK.

NEW ENGLAND SPECIALTY CO.

North Easton, Mass.,

MANUFACTURERS OF

LEAVITT'S IMPROVED SCREW DRIVERS,

With Barbed Tang. (Patent applied for.)

LEAVITT'S PATENT COMMON SENSE CAN OPENER.

Patented Novelties and Hardware Specialties.

SHEET METAL PUNCHING TO ORDER.

The HUGUNIN, IMPROVED, ADJUSTABLE, SASH BALANCES;

HAVING LATE PATENTED IMPROVEMENTS.

3 Sizes: { No. 1, 1¼ in. wide; 30 lb. Sash and under. / No. 2, 1¼ " 20 lb. " " / No. 3, ¾ " 16 lb. " " } MALLEABLE AND GRAY IRON.

The *Improved* goods have been made and sold the past four years, with satisfaction to the dealer and user; proven by increasing orders from the best trade. The principle and mechanism of these goods meet the approval of those competent to judge them. They movably balance sash by an unlimited and cheap power—*automatically controlled friction*—regulated to the weight of the sash by a patented adjusting screw, with a surplus power in reserve, available by further drawing the adjusting screw, without removing the balances or sash. The Balances will give permanent satisfaction if applied according to the simple, illustrated directions sent with the goods. All genuine Improved Hugunin Balances have "*Robt. B. Hugunin, Patentee and Solely Authorized Maker*" cast directly on the face of the goods. Reject all others as fraudulent imitations, and save future trouble. My old *unrecommended* style has been fraudulently copied, using the date of one of my minor patents, Nov. 6, 1877—never used on the genuine goods—the copier having no patent—and slyly sold through snide dealers, to the great injury and loss of the buyer. I have constant letters of complaint, and advise all who have been swindled to keep their evidence till *settlement day* comes round. I still sell unrecommended, 1877 style, at half price. No clock springs to rust out and set; no combination claptrap to get your money, but fully warranted goods. Simple, durable, efficient, cheap. For sale by the best trade everywhere. Goods delivered in New York free. Address orders, &c.,

ROBT. B. HUGUNIN, Hartford, Conn.

BUTTERFIELD & CO., MANUFACTURERS, DERBY LINE, VT.

SEND FOR DISCOUNTS.

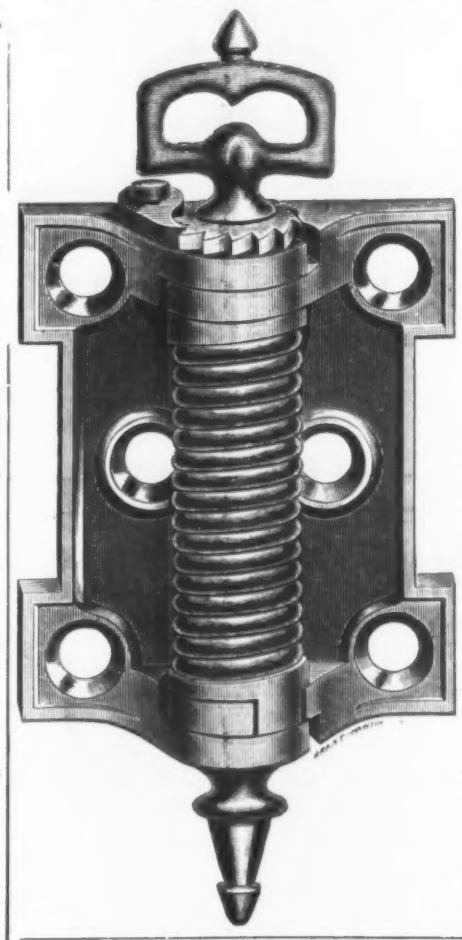
GLENN'S Patent Balanced

Hydraulic and Steam Valves

For Controlling Machinery on Men of War, Shipboard, Docks, Elevators, Rolling Mills and Steel Mills, &c.

For additional information and prices address

J. S. GLENN, Manufacturer, 115 Fremont St., Chicago, Ill.



WIRE DOORS,

With Knob and Hinges ready to put up, in Green or Gray Colors, $2.00 each. Fancy Designs 50 cents Extra. Liberal Discount to the Trade in wholesale lots.

Every house should have them to keep out Flies and Mosquitoes.

THE BEST

SPRING HINGES

Ever offered, perfect every way, 25 cents per pair.

Painted Wire Cloth, Copper, Brass and Iron Wire Cloth, Brass and Copper Wire, Wire Ropes and Cords, Copper Cable Lightning Rods, Wire Work of all kinds.

DE WITT

Wire Cloth Co.,

87 Chambers St., New York.

703 Market St., Philadelphia.

110 Lake St., Chicago.

W. H. JACOBUS. DONALD McKAY.

W. H. JACOBUS & CO.,

HARDWARE MANUFACTURERS' AGENTS,

No. 90 Chambers Street, New York.

AGENTS FOR

The Morris Sash Lock Mfg. Co., The Ireland Mfg. Co., Lorenz Bommer, Penn Lock Works, Dibble Mfg. Co., Zimmerman's Blind Adjusters.

"BUFFALO CHAMPION"

ICE + CREAM + FREEZERS,

Four Styles. Sixteen Sizes.

We introduced these Freezers in 1873 Confectioners, Hotels, Restaurants and Families have thoroughly tested and approved them. *The best Freezers made.*

For Illustrated and Descriptive Price Lists, address the Sole Manufacturers,

Sidney Shepard & Co.,

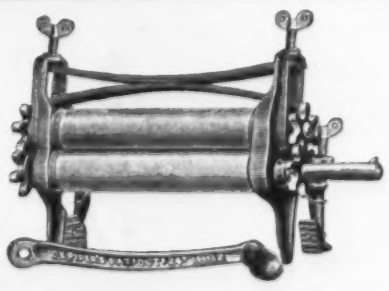
BUFFALO, N. Y.,

OR

C. SIDNEY SHEPARD & CO.,

Chicago, Ill.

They are the Handsomest Wringer made,



and we offer them as a Superior Article.

"THE AMERICAN."

We have recently greatly improved our Wringers and now offer a line of machines of a superior quality to any made. We have strengthened the frames where they required, and guarantee them to wring as dry and unconditionally to TURN EASIER than any wringer made. The frame is galvanized in the best manner, and the Shafts are of Steel. We use enameled handles on all our Wringers, which are not effected by alkali or water.

Send for Catalogue and Prices.

THE TRIUMPH WRINGER CO., Keene, N. H.

ALRUTZ & CO., Ledger Building, PHILADELPHIA.

34 Skeppsbron, Stockholm, 101 Leadenhall St., London.

O. B. A. **SWEDISH** PIG IRON,

Suitable for the Open-Hearth, and the Crucible Steel making processes.

FAGERSTA LILY SWEDISH PIG IRONS,

Highly suitable for the Open-Hearth process.

SWEDISH Bars, Blooms, Billets, Nails Rods, Wire Rods, &c., direct from the works.

SHIELDS & BROWN,

78 and 80 Lake St., CHICAGO, ILL. 132 Cedar St., NEW YORK.

FOR BOILERS AND STEAM PIPES. Reduces condensation of STEAM.

MANUFACTURERS AND SOLE PROPRIETORS OF

Awarded first and only Prize, **Silver Medal,** at the late National Railway Exposition.

Send for Illustrated Pamphlet, and mention *The Iron Age.*

FOR GAS AND WATER PIPES. Prevents Sweating & Freezing.

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending March 3, 1886:

Hardwares.

Boker Hermann & Co.
Hardware, cutlery & guns, pkgs., 189
Cleathers G. G.
Machinery, case, 1
Coppel Alex.
Ironware, cs., 8
Cortes R. J.
Shackles, bdl., 1
Chains, 12
Iron chests, cs., 4
Davies, Turner & Co.
Machinery, cs., 1
Iron weight, 1
Dieckerhoff, Raffloer & Co.
Cases, 2
Dodge & Olcott,
Cases, 2
Downing R. F. & Co.
Ironware, pkgs., 4
Fillesheimer Isador,
Cases, 10
Frasse Peter & Co.
Mdse., cs., 2
Hammacher, Schlemmer & Co.
Ironware, cs., 22
Hartley & Graham,
Arms, cs., 9
Hoe R. & Co.
Files, cks., 4
Judd H. L. & Co.
Cases, 12
King Hezekiah,
Mdse., pkgs., 5
Scythe plows, bxs., 50
McCoy & Saunders,
Hdw. and cutlery, cs., 8
Mer. Dis. Co.
Case, 1
Morris L. W. & Son,
Packages, 7
Newton & Shipman,
Files, casks, 3
Osborne & Burke,
Cask, 1
Schoverling, Daly & Gales,
Gun barrels, cs., 14
Arms, cs., 2
Schulz & Ruckgaber,
Cutlery, case, 1
Schutte W. & Co.
Cases, 16
Sheldon G. W. & Co.
Cutlery, cs., 2
Wafelaer Lewis,
Nails, kegs, 57
Wiebusch, Hilger & Co.
Hdw., cutlery and guns, pkgs., 98
Cases, 3
Chains, cks., 25
Order,
Axle, 1
Anvils, 148
Files, cks., 4
Cases, 3

Iron.

Brown Bros. & Co.
Spiegel, iot, 1
Coddington T. B. & Co.
Sheets, bdls., 653
Sheets, bxs., 10
Crocker Bros.
Ferro iron, tons, 390¾
Hammacher, Schlemmer & Co.
Wire, cs., 8
Herbst & Co.
Package, 1
Heyn Alfred,
Wire rods, bdls., 677
Kracher F.
Case, 1
Mason John W. & Co.
Wire rope, coils, 2
Naylor & Co.
Rails, 521
Oliver & Roberts Wire Co.
Mdse., cs., 4
Pim, Forwood & Co.
Plate, 1
Bundles, 96
Iron ridging, case, 1
Stetson Geo. W. & Co
Pig, tons, 450
Order,
Pig, tons, 725
Wire rods, coils, 6129
Ferro iron, tons, 139
Casks, 144
Wire rods, bdls, 3848
Spiegel, tons, 280
Old rails, tons, 300

Steel.

Abbott Jere & Co.
Cases, 9
Mdse., cs., 12
Downing R. F. & Co.
Bundles, 97
Drexel, Morgan & Co.
Billets, 7030
Meissner, Ackermann & Co.
Wire, coils, 1312
Mersick C. S. & Co.
Bundles, 52
Cases, 5
Bars, 7
Newton & Shipman,
Bundles, 50
Bars, 10
Cases, 5
Naylor & Co.
Rails, 1442
Rods, bdls., 8524
Billetts, 387
Sheets, cs., 85
Bars, 1554
Billets, pcs., 222
Pilditch F. S.
Bundles, 347
Cases, 4
Seligman J. W.
Bars, 161
Sellers W. B.
Plates, case, 1
Order,
Tubes, 69
Tubes, cs., 3
Car-wheel tires, 4
Bars, 58
Bundles, 4
Cases, 13
Casks, 17

Metals.

Baring Bros. & Co.
Tin plates, bxs., 575
City Button Works,
Zinc, pkgs., 40
Dickerson, Van Dusen & Co.
Tin plates, bxs., 1911
Graef Cutlery Co.
Metal wire, cs., 9
Lebend & Spiegel,
Brass, pkgs., 4
Mende A. P.
Metal ware, cs., 30
Phelps, Dodge & Co.
Tin plates, bxs., 3101
Straus A. D. & Co.
Old metal, pkgs., 28
White Dental Mfg. Co.
Platina, case, 1
Order,
Tin plates, bxs., 3702
Spelter, ingots, 2425
Quicksilver, bot., 158

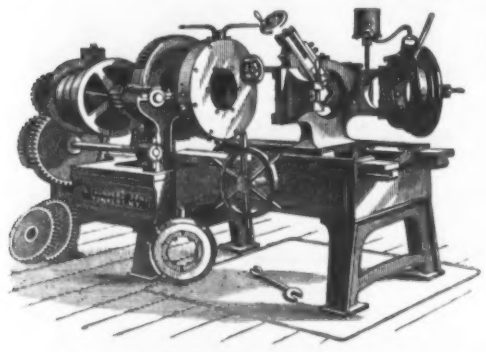
The imports at this port of Hardware, Cutlery and Metals during the week ended February 26 were as follows:

	Quantity.	Value.
Brass goods	56	$4,419
Bronzes	15	1,089
Chain and anchors	3	65
Clocks	60	4,278
Copper	....	307
Cutlery	130	37,826
Dutch metal	18	3,954
Guns	48	2,613
Hardware	20	3,112
Iron, pig, tons	886	10,398
Iron, sheet, tons	27	2,110
Iron, spiegel, tons	2,235	56,941
Iron ore, tons	2,304	6,966
Iron, tubes	176	193
Iron, other, tons	385	22,850
Lead, pigs	3,748	14,380
Machinery	180	10,895
Metal goods	403	34,559
Nails	15	577
Needles	30	6,117
Nickel	11	3,624
Old metal	....	10,783
Platina	1	637
Plated-ware	13	685
Pins	12	720
Plumbago	406	7,325
Regulus antimony	149	7,439
Steel	61,062	56,406
Spelter, lb	110,230	4,165
Tin, bxs	63,495	256,243
Tin, 6,858 slabs, 667,233 lb	....	151,309
Wire	1,690	3,685
Zinc oxide	450	4,055

It appears that in the United States there are upward of 95,000 arc and 250,000 incandescent lamps distributed in over 400 towns and cities. Only 13 years ago Professor Tyndall exhibited in Philadelphia probably the first arc light seen in public in the United States, and at present there are not less than $70,000,000 invested in the business of electric lighting in this country alone; at least 25,000 incandescent and 12,000 arc lamps are newly installed each year. Over 6 tons of mercury and 700 air pumps are in use for the manufacture of glow lamps. In Paris in 1878 the cost to the city was at the rate of 29 cents per hour for a lamp of from 500 to 700 candle-power. To-day, under like general conditions, the City of New York pays at the rate of about 6 cents per hour for a lamp of 2000 candle-power. There are 300,000 carbons manufactured for arc lamps in the United States daily, one of our large firms consuming 25 tons of petroleum coke per week.

From a Rochester (N. Y.) paper we learn that a suit has been commenced in the United States Circuit Court involving the ownership and infringement of a patent of great value. The title of the action is the Shipman Engine Co. against the Rochester Machine Tool Co. The suit has been brought to restrain the defendant from using or infringing upon the patent of Albert H. Shipman, granted September 2, 1884, for an improved regulator for controlling the fire in engines. This is one of the well-known devices which has given the Shipman engines their reputation. It is an automatic safety arrangement which puts out the fire when the pressure gets too high. It is further claimed that the defendants are using several other patents controlled by plaintiff, and suits thereon will be at once commenced. Mr. George B. Selden, the attorney for the plaintiff, has also been instructed to bring actions against all purchasers of the defendant's engines.

D. SAUNDERS' SONS,



SEND FOR CIRCULARS.

MANUFACTURERS OF

Pipe Cutting and Threading Machines

For Pipe, Mill and Steam Fitters' Use.

Tapping Machines

For Steam Fitting. Also

STEAM AND GAS FITTERS HAND TOOLS,

No. 95 Atherton Street,

YONKERS, N. Y.

LEGGETT'S LIQUID FISH GLUE.

QUALITY THE BEST.

THE MOST CONVENIENT PACKAGE EVER OFFERED.

Easy to Open and Close, and Always Ready for Use.

Patented January 19, 1886.

Leggett & Brother,

301 Pearl St.,

NEW YORK.

ALSO

MIXED PAINTS, In 1 lb., 2 lb. and 5 lb. cans.

VARNISHES, In ½ Pint, Pint and Quart cans, with brush attached.

EUREKA!

—OLSON'S PATENT—

SPIRAL SCREW DRIVER.

The most wonderful labor-saving Tool ever known.

An entire revolution in driving Screws.

A Perfect Novelty.

What the Mechanics say:

"Two-thirds of the time saved. I can not afford to do with out it. It will drive a screw into wood, soft or hard in one-third of the time of any other mode in use."

Put oil in hole on the side before using

Made in two sizes. Length of large one extended, 19 inches, closed 12 inches.

Small one, opened 14 inches, closed 9 inches. Blades 1-4 and 5-16in.

SOLD BY

C. E. Jennings & Co., N. Y. Hibbard, Spencer, Bartlett & Co., Chicago. Simmons Hardware Co., St. Louis, Mo. Walbridge & Co., Buffalo, N. Y. A. Freeman, Chicago.

And all other Hardware Dealers throughout the United States and Canada. Manufactured by

DECATUR COFFIN CO., Decatur, Ill.

THE BEST AND ONLY COMPLETE ARRANGEMENT FOR

WINDOW

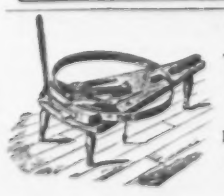
— AND —

Door Screens

ever invented. No mortising or tenoning, cannot sag or warp, and any one can make them. CORNERS finished in BRONZE or NICKEL PLATE. STICKS in the WHITE or stained in imitation of BLACK WALNUT.

SEND FOR PRICE LIST.

Porter Mfg. Co., Burlington, Vt.



LITTLE GIANT WAGON

Tire Upsetter,

The Best and Cheapest.

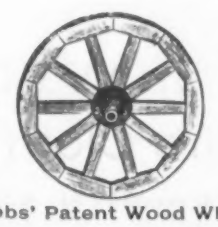
Send for Circular, price lists and discount.

LITTLE GIANT MFG. CO.,

MILLPORT, N. Y.

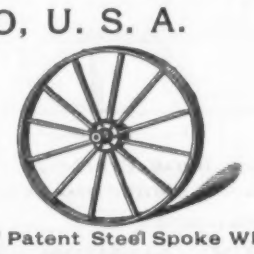
THE KILBOURNE & JACOBS MFG. COMPANY,

COLUMBUS, OHIO, U. S. A.



Jacobs' Patent Wood Wheel.

"Columbus" Solid Steel Scrapers.



Jacobs' Patent Steel Spoke Wheel

Is pressed from ***one solid sheet of heavy steel,*** and is the strongest and most durable Road Scraper made. We make three sizes of these Scrapers. No. 1, Capacity, 7 cubic feet of earth. No. 2, 5 cubic feet of earth No 3, 3½ cubic feet of earth. Furnished with or without ***solid steel shoes or runners,*** as desired. We also furnish these Scrapers with ***end gates*** when so desired. The bails are of refined iron, with strong and perfect working swivels. Bowls nest and handles crate compactly for shipment.

RAILROAD OR CANAL BARROW.

With Jacobs' Patent Wood Wheel. Bent Tray, full sized, planed and well finished.

We Also Manufacture.

BRICK TRUCKS,

BRICK WAGONS,

Store and Warehouse **TRUCKS,**

Both Boston and Western Pattern.

Also,

SPECIAL TRUCKS of every kind.

Baggage Barrows,

Express Wagons,

&c., &c.

Also,

ROAD LEVELERS, GRADERS, EXCAVATORS, &c., &c.

and

Wrought Steel Sinks.

"COLUMBUS" Solid Steel Tray Barrows.

No. 1, capacity 3½ cu. ft., Jacobs' Patent Steel Spoke Wheel.

No. 2, capacity 5 cu ft., Jacobs' Patent Steel Spoke Wheel.

RAILROAD OR CANAL BARROW.

Same as above, except with Jacobs' Patent Steel Spoke Wheel.

OPEN BOTTOM BRICK BARROW.

With Jacobs' Patent Wood Wheel. Folds for shipping, same as Garden or Farm Barrow.

ORE OR MORTAR BARROW.

With Jacobs' Patent Wood Wheel. All hardwood. Bowl ***dovetailed*** together and firmly nailed.

STRAIGHT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. Strong, well-made, iron strapped over bottom and bolted together. For stone or pig iron, &c.

GARDEN OR FARM BARROW.

Set Up.

Double Frames and so constructed that by simply removing one bolt (the axle) and two nuts they can be folded flat down (see cut) and shipped at lowest rate of freight. Three sizes.

BENT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. 17¾-inch tire. Well ironed and bolted. Extra strong.

Folded for Shipping.

STEEL BOTTOM STONE BARROW.

Bottom and Dash formed of ***one plate of Steel one-fourth of an inch thick.*** Steel Spoke Wheel. The strongest and best Stone Barrow manufactured. Very durable.

THE "K. & J." WHEEL SCRAPER.

The Bowl or Box is made of the Best Steel Plate, 3-16ths of an inch thick. The Tongue Braces or Bail Lever and Hangers are all of **Steel.** **Sarven patent wheels.** These Scrapers have no wood parts to rot or castings to break, no ratchets to clog up, and fewer nuts to come off and parts to get out of order than any other Wheel Scraper. They are so constructed that the team does most of the lifting, and **One Man** can fill, raise and dump the largest size with ease. They are so hung that there is absolutely NO STRAIN WHATEVER ON THE HORSES' NECKS.

No. 2, Capacity 12 cubic feet. No. 3, Capacity 16 cubic feet.

LATHES, BUFFERS, GRINDERS, CIRCULAR SAWS, FORGES

and other Brass and Metal Working Machines. Wood Working Machines for Pattern use, &c. *Illustrated Catalogues free.* Don't send stamps.

P. PRYIBIL,

467 W. 40th St., New York.

DOG COLLARS, LEATHER AND WIRE MUZZLES

OF EVERY DESCRIPTION.

POPE & STEVENS,

114 Chambers St., N. Y.

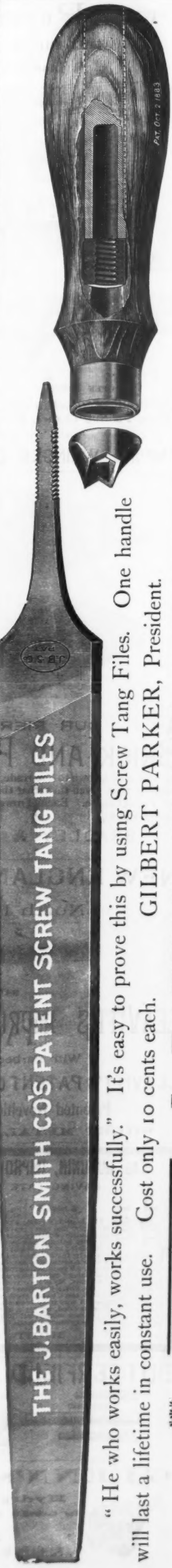
We manufacture a complete line of

DOG COLLARS,

Of Gold, Silver, Brass,

and all kinds of Leather

The above cut represents our Mastiff or St. Bernard Dog Collar. Illustrated Catalogue sent free on application.



PHILADELPHIA, PA., U. S. A.

J. BARTON SMITH COMPANY,

GILBERT PARKER, President.

"He who works easily, works successfully." It's easy to prove this by using Screw Tang Files. One handle will last a lifetime in constant use. Cost only 10 cents each.

ESTABLISHED 1842.

JOHN P. LOVELL'S SONS, BOSTON, MASS.,

MANUFACTURERS OF

Single Breech-Loading Shot Guns, Revolvers, Police Goods, Roller Skates.

THE BEST YET!

"SIDE SNAP CHAMPION"

Hammerless Single Breech-Loading Shot Gun.

PRICES.

Plain Barrel, 12 bore.....	$15.00	Twist Barrel, 12 bore.....	$18.00
" " 10 "	16.00	" " 10 "	19.00

SAFETY DOUBLE ACTION REVOLVER.

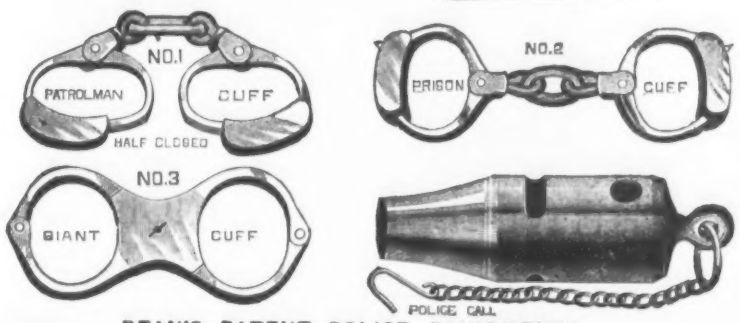
Simple in Construction. Durable and Effective in Action.

Retail Price, Nickel and Rubber Stock, $7.50.

AFTER firing the revolver, by throwing open the gate the cylinder swings out to the right, then by pressing the cylinder down on base pin the exploded cartridges are instantly extracted, as shown in illustration. The revolver possesses all the advantages of any revolver in the market, with patent self-acting shell ejector, extracting all the empty shells by one motion, and the price is much lower than those of other makes. We make this at present to use only the 38 S. & W. C. F. Cartridge.

Special Inducements to the Trade to Handle Our Goods.

Send for our New Illustrated Catalogue.



BEAN'S PATENT POLICE EQUIPMENTS.

MANUFACTURED AND FOR SALE BY

JOHN P. LOVELL'S SONS,

147 WASHINGTON STREET, BOSTON, MASS.

Send for Catalogue. Mailed, post-paid, on receipt of price.

PRICES.

Club, 8 and 10 inch,	$1.50	No. 2 Cuff, Polished,	$4.00
" 12 and 14 inch,	2.00	No. 3 Cuff, Plated, with Pocket,	6.50
No. 1 Cuff, Plated,	4.75	Police Call,	1.00
No. 1 Cuff, Polished,	4.00	Police Hook,	1.25
No. 2 Cuff, Plated,	4.75	Twisters,	1.00

NEW MODEL

Top Snap Champion Breech-Loading

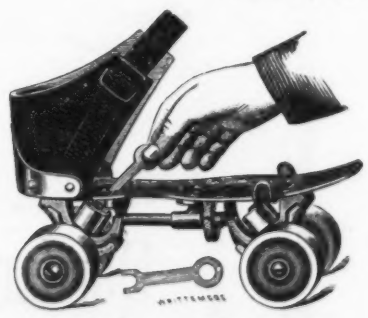
SHOT GUN.

LOVELL ROLLER SKATES.

LATEST AND BEST.

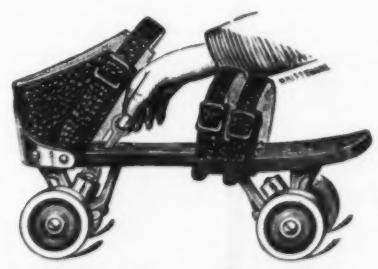
LOVELL ROLLER,

ALL CLAMP.



LOVELL ROLLER,

HALF CLAMP.



LOVELL ROLLER,

RINK.

PRICES.

AMERICAN BULL DOG.	22 Calibre,	$3 50	
" " "	32 "	4 00	
" " "	38 "	4 50	
" " "	44 "	5 00	

All these Revolvers are made with Hard Rubber Stocks.

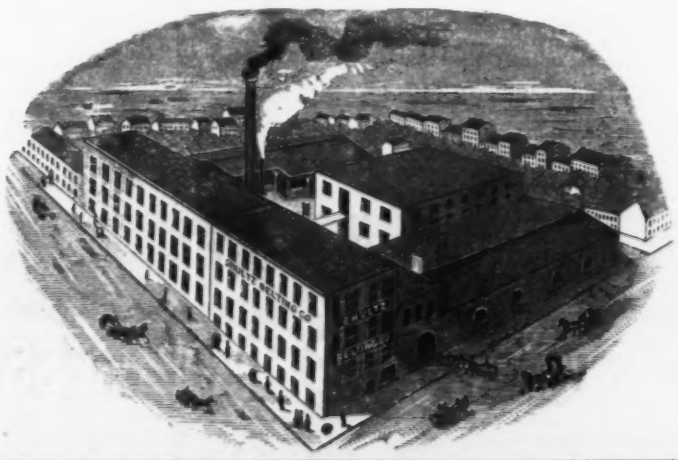
AMERICAN "BULL DOG"

DOUBLE ACTION REVOLVER.

A. J. SHULTZ, President. B. C. ALVORD, Secretary.

SHULTZ BELTING COMPANY,

MANUFACTURERS OF



Shultz Patent Fulled Leather Belting, Lace and Picker Leather.

Our *Belting* is made of Leather, tanned on the surfaces only; the interior (which is the fiber and strength of the hide) is not tanned, but Rawhide fulled and softened by our patent process. Our belting is more pliable, and hugs the pulley better and transmits more power than any other Belt. It does not pull out at the lace holes or rivets. It stretches less than any other Belt. It works equally well for the largest Driving Belts or for the fastest running machinery and smallest pulleys. Our *Lace Leather* is made of Rawhide by our patent process, without any tanning, and is stronger and will wear better than any other. We also make the best Picker Leather and Belt Grease in the country. Satisfaction guaranteed.

Bismarck and Barton Sts., St. Louis.

AGENTS IN ALL CITIES.

"CLIMAX"

Barn Door Hangers,

"ZENITH"

Barn Door Hangers,

FOR WOOD TRACK.

Moore's Freight Car Door Hangers,

Baggage Car Door Hangers,

RAILROAD HANGERS,

Parlor Door Hangers.

Send for New Price Lists.

Moore Mfg Co.,

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Henry B. Newhall Co.,

105 Chambers St., N. Y.

Eastern Agents.

THE "PERFECTED" LEMON SQUEEZER,

WITH

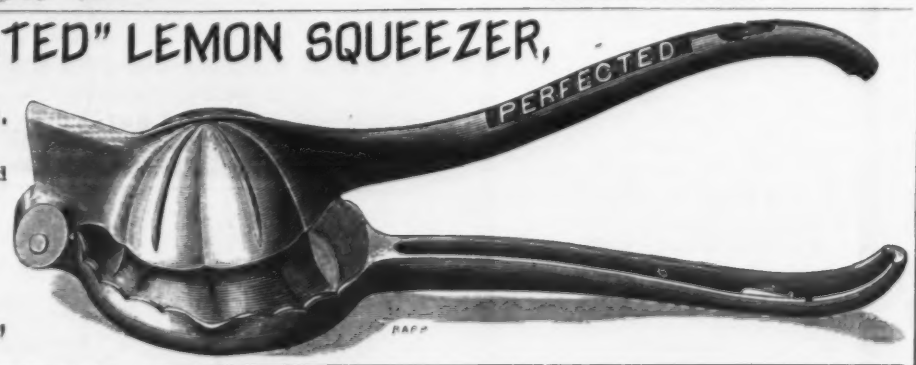
Knife for Cutting the Lemon.

Made of Best Malleable Iron and heavily tinned in the best manner.

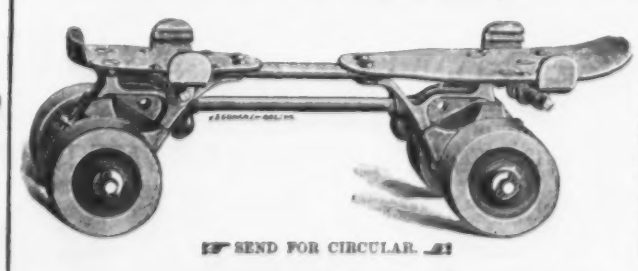
SEND FOR PRICES.

THE ACME SHEAR CO.,

Bridgeport, Ct.



"HARVARD," BEST IN THE WORLD.



Made of the very best materials; simple in construction; light and neat in appearance; noiseless in movement; easy to keep in order; finished in thorough and workmanlike manner; warranted to possess all the qualities and requirements necessary for any and all purposes where ROLLER SKATES ARE USED.

Rubber Cushion held in Patent Adjustable Box; can be raised or lowered at pleasure to take up all wear.

☞ SEND FOR CIRCULAR. ☜

Harvard Roller Skate Company,

237 WASHINGTON ST., BOSTON, MASS., AND 96 CHAMBERS ST., NEW YORK.

THESE TWO CUTS REPRESENT EXTREME SIZES OF

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NEW HAVEN (CONN.) STAPLE WORKS.

"REGULAR GAUGE" for FLOURING MILLS, GRAIN ELEVATORS, &c

"Extra Heavy" for handling Ores, Coal, Broken Stone, &c,

Send for illustrated price list.

W. J. CLARK & CO., Sole Manufrs.

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EXCLUSIVELY **HAND-CUT** FILES and RASPS.

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THE CHELSEA FILE WORKS

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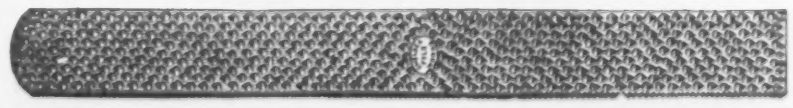

The superiority of our Horse Rasps over all others is universally admitted by those who use them, and their high degree of excellence will be scrupulously maintained. Give them a trial and use no others.

THE INTERNATIONAL RESOLVENT.

The Concentrate Tannin Antidote to Scale and Foam in Steam Boilers.

Recognized by the highest authorities as the true and silent Solvent and Preventive. Free from every objection. In bulk from extensive works at source of supply. More of the active principle for the cost than possible in any other. Full guarantee to remove ALL scale and to prevent foam in any boiler with any water. Purely vegetable and harmless.

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Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample, The trade free.

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Circulars give full instructions.

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GENERAL AGENT FOR

WHITWELL FIRE-BRICK STOVES

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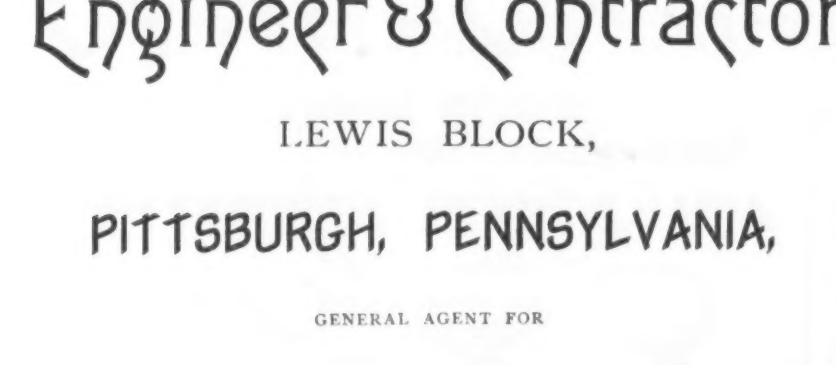
Clapp-Griffiths Patents for Manufacture of Soft Steel,

SPECIALLY ADAPTED FOR A No. 1 BOILER PLATES, BOILER RIVETS, WIRE RODS STAY BOLTS STAMPING WARE, NAIL PLATES, &c.

Will contract to completely erect, equip and place in operation Blast Furnace Whitwell Stoves and Steel Plants as above. As I manufacture at our own works everything appertaining to Blast Furnace and Steel Works construction, can guarantee promptness and satisfaction.

ROMER & COMPANY, Manufacturers of PATENT

JAIL LOCKS, BRASS and IRON PADLOCKS,



DASH AND CARRIAGE LAMPS,
LANTERNS,

atent Horisontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

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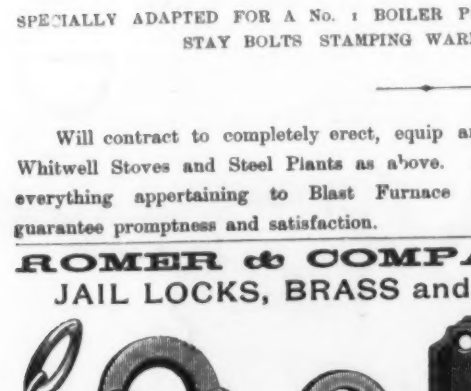

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Victor Door Knob.

Superior to any in Strength and Durability.

SEND FOR CIRCULARS.

Perfect Adjustment to Doors without the Use of Washers. No Screws to work out.

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VICTOR DOOR KNOB CO.,

118 Duane St.,

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DOOR HOLDER

Coultaus' Patent.

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Medal of Merit Awarded by the American Institute, New York, 1884.

The door is held in any desired position by the pressure of the roller on the floor, making it a most useful article for dwelling houses, offices, stores, hotels, railroad cars, hospitals, &c., and doing away with the hooks, chains, wedges, bricks, &c., ordinarily used for this purpose. The rubber covering to the roller does no injury to carpets or oil cloths, and by simply lifting the handle the spring can be thrown out of use when desired. If the holders are required to operate against very strong springs or winds, it should be so stated when ordering.

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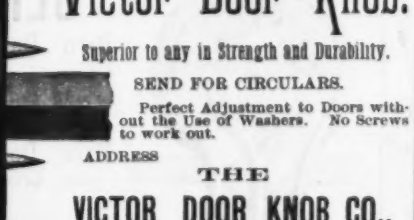
Dealers in Steel, Copper, Brass, Tin Plated and Copper Plated Wire.

Manufacturers of BESSEMER STEEL WASHERS.

PATENT SPOOL WIRE FOR THE RETAIL HARDWARE TRADE.



Dealers who handle it do away with the BROKEN BUNDLE BUSINESS and sell small quantities by the spool only. It is a convenience for both dealer and consumer. It is SHELLAC COATED and CANNOT RUST: is wound like spool cotton on QUARTER POUND HALF POUND and ONE POUND Spools, one dozen spools in a box.

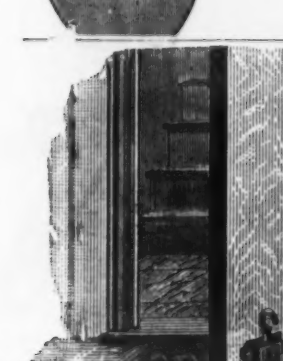
Our spooled HAIR WIRE is the best in the market.

For Sale by

Hardware Jobbers Everywhere.

SEND FOR ILLUSTRATED PRICE LIST.

SPECIAL WIRES FOR MANUFACTURING PURPOSES ON ANY SIZE OF SPOOL.



IRON LEVELS.

Sliding Nut Calipers.

Screw with Sliding Nut easily attached to old Calipers or Dividers.

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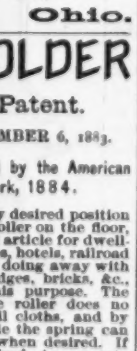

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No. 10 Peck Slip,

NEW YORK.

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TAYLOR'S

Arctic Metal,

—FOR—

Journal Bearings, and Babbitting Purposes on Iron, Wood or Brass.

Are You Troubled with

Hot Boxes?

If so, a trial of this Metal will convince you of its merit, as we have yet to find an instance where, by its use, a Hot Bearing will not only run cool, but wear longer than with any other Metal manufactured.

The superiority of this metal over all others is as follows:

1. That while hot it is the least expanded.
2. When cold the least contracted.
3. When melted it flows thinner than any other metal.
4. It makes the most perfect Bearing, either on Cold Iron or Wood.
5. It resists heat as an element of waste longer than any other Anti-friction.
6. It is the best retainer of oil.
7. It requires a high degree of heat by friction to displace it.
8. When its base is cast iron or brass its density is sufficient to stand any weight or velocity.
9. Its cost is less than the best Babbitt.
10. The finest grained metal in the market.

In addition to all the qualities named may be added the most tenacious white metal in the market, and which in remelting will run almost as thin as water, without waste.

When once tried this metal is sure to take the place of all other anti-frictions.

The nature of this metal is such that any dust, sand or grit which may find its way to the shaft through oil holes or otherwise does not grind between lining and shaft, but is immediately imbedded in the metal, thus preserving shaft in perfect condition.

The metal is cast in bars weighing about 5 lbs. Each package contains printed directions for use.

N. B.

THE ARCTIC

ROLLING MILL METAL.

This metal, which is of the same general nature as our popular "ARCTIC METAL," is made to perform service where metal lining is subjected to intense pounding pressure.

We advise its use on Crank Pins, Cross Heads, Main Engine Bearings, Bearings of Heavy Rolling Mill Machinery, &c.

We guarantee it to do satisfactory service, no matter what the pressure.

A Sample Order will meet with prompt attention.

THE SMITH & EGGE MFG. CO.,

BRIDGEPORT, CONN.

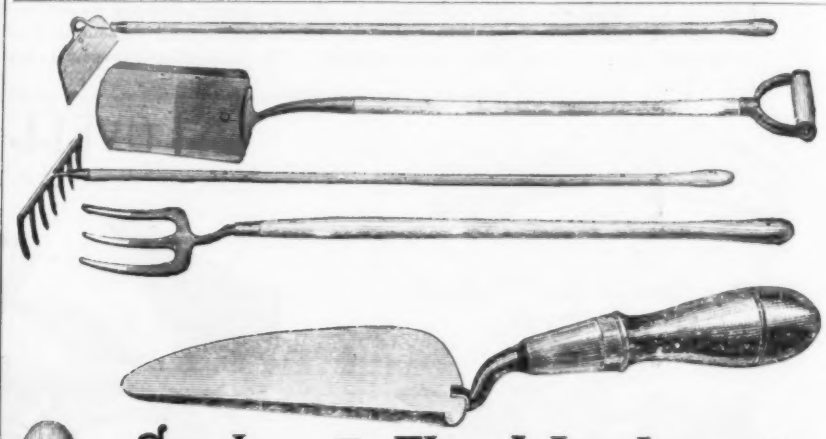
THE GIANT PAD LOCK.

Centennial Award. "Superior in Every Respect."

This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."



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C. W. DUNLAP & CO.,

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We make a larger variety of these goods than any other manufacturer in the United States.

All Goods Made to a Standard.

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MF'RS OF

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BLAST FORGES

Steel & Iron Drop Forgings

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THE T. H. BULLOCK **BELLOWS & FORGE CO.,**

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FUSE, CAPS, REELS,
BATTERIES,
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HERCULES POWDER

Thawing Kettles and Stump Blasting Tools.

There is no longer any doubt but Hercules Powder is the cheapest for all mining, quarrying, and railroad work, while thousands have proved it so for stumps and boulders. **HERCULES POWDER CO., 40 Prospect St., Cleveland, O.**

THE VICTOR HANGER! EASIEST WORKING.

MANUFACTURED BY VICTOR MANUF'G CO., Custom House Square, Newburyport, Mass.

1886 PENNSYLVANIA LAWN MOWER.

Has No Equal,

Surpassing All Others

AND PRONOUNCED

"THE BEST."

Illustrated Price Lists sent upon application. Please write for same to

LLOYD & SUPPLEE HARDWARE CO., Phila.
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AMES PLOW CO., Boston, Mass.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATHEWS, Rochester, N. Y.
MARKLEY, ALLING & CO., Chicago, Ill.
LOGAN, GREGG & CO., Pittsburgh, Pa.
JANNEY, SEMPLE & CO., Minneapolis, Minn.
HUNTINGTON, HOPKINS & CO., San Francisco, and Sacramento, Cal.
FOSTER, STEVENS & CO., Grand Rapids, Mich.
GEO. TRITCH HDW. CO., Denver, Col.
MOOREHOUSE, WELLS & CO., Decatur, Ill.
A. E. BONESTEEL, Troy, N. Y.
WALBRIDGE & CO., Buffalo, N. Y.
CLARK, QUIEN & MORSE, Peoria, Ill.
HALL & WILLIS HARDWARE CO., Kansas City, Mo.
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THE TODD-DONIGAN IRON CO., Louisville, Ky.

QUAKER CITY LAWN MOWER.

1886.

Guaranteed Superior to any other Center Cut MOWER on the market.

THE QUAKER CITY

Reduced in Price.

NOW, WHY BUY A WORTHLESS MOWER?

Send for List.

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Continental Lawn Mower.

1886.

LIGHTEST RUNNING AND SWIFTEST CUTTING.

Cutting Bar in the rear adapting itself to all unevenness of the ground.

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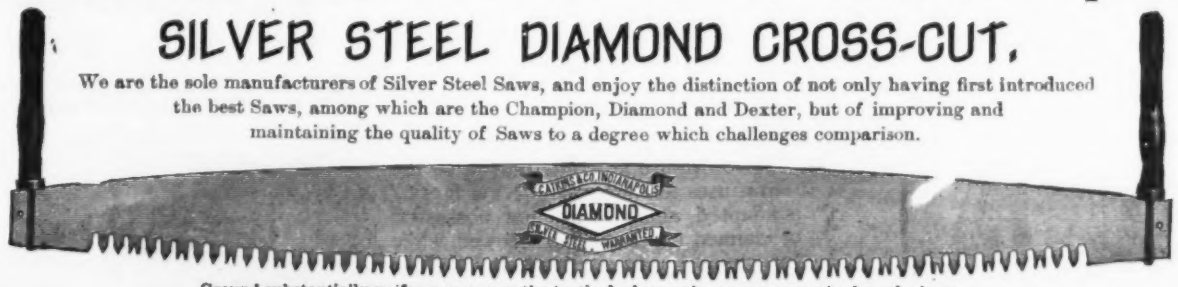
ISAAC WALKER HDW. CO., Peoria, Ill.

ATKINS ALWAYS AHEAD. AAA E.C. ATKINS & CO. INDIANAPOLIS, IND. TRADE MARK

E. C. Atkins & Co., Indianapolis, Indiana.

SILVER STEEL DIAMOND CROSS-CUT.

We are the sole manufacturers of Silver Steel Saws, and enjoy the distinction of not only having first introduced the best Saws, among which are the Champion, Diamond and Dexter, but of improving and maintaining the quality of Saws to a degree which challenges comparison.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

ATKINS'

Cross-Cut, Circular, Band and Gang

SAWS

Are Everywhere Recognized as the

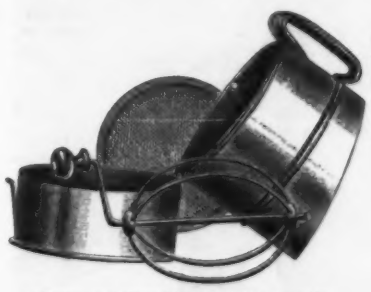
Standard of Excellence.

HENRY FOUR-PIECE SIFTER,

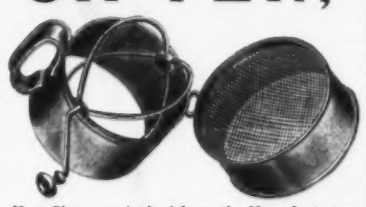
MANUFACTURED BY THE

Straubinger Sifter Mfg. Co.,

LA FAYETTE, IND.



Agitator and Sieve Removed for Cleaning.



New Sieve can be had from the Manufacturers.

The only Sifter in the World from which the Sieve can be removed for cleaning or renewing.

Mixer, Measurer, Weigher, Scoop, Egg Beater, Rice Washer, Starch, Wine and Fruit Strainer.

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THE HUNTER SIFTER MFG. CO.

Write to the Manufacturers for Circulars, Prices and Discounts.

And for sale by all Jobbers of Hardware and Tinners' Stock.

Peavies & Pike Poles

For River Driving.

Cant Hooks for Mill and Woods Use

Hand Spikes, Setting Poles, Skidding Tongs and Swamp Hooks.

Best Steel Boat Calks and Sets.

Largest Manufacturers of Shingle Bands.

Capacity, 3 Tons per Day.

"BLUE LINE" LUMBERING TOOLS.

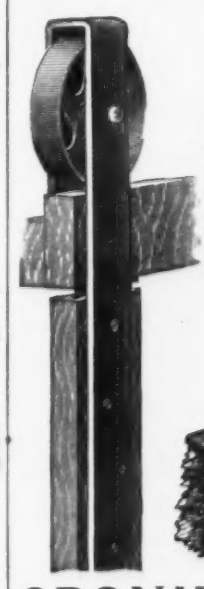
MANUFACTURED BY

MORLEY BROTHERS, EAST SAGINAW, MICH.

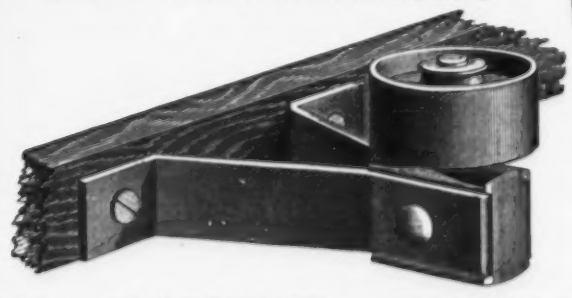
CRONK'S Wrought Iron Barn Door Hanger

AND

Stay Roller.



In offering to the trade of 1886 our Celebrated **Wrought Iron Hangers and Stay Rollers,** special attention is called to our **Iron Clad Track** in connection with our Hangers. It is made complete, only requiring hammer and nails to attach it to the building. We make the broad claim that whoever uses our Hangers and Iron Clad Track has the best device known for sliding doors. These hangers never break; cannot get off the track, and work so easy that they can be operated by a child. Every pair guaranteed to give satisfaction. For sale by hardware dealers generally.



CRONK HANGER COMPANY

ELMIRA, NEW YORK.

ROCK and ORE BREAKERS and CRUSHERS.

(The Blake Style.)

This style of Rock Breaker, after 15 years' practical test at HOME and ABROAD, has proved to be the best ever designed for the purpose of breaking all kinds of hard and brittle substances, such as

Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper, Tin and Lead Ores.

ALSO FOR MAKING

RAILROAD BALLAST AND CONCRETE.

Mr. S. L. MARSDEN, who for the past 20 years has been connected with the manufacture of the "Blake Crusher," superintends the making of the machine.

Gold Medal awarded at the Massachusetts Mechanic Association, 1881, and **Silver Medal** (Special) at American Institute, New York, 1882. Address

FARREL FOUNDRY AND MACHINE CO.,

ANSONIA, CONN.

—THE—

SHUMARD SASH BALANCE CO.,

OFFICE, 1114 North E Street.

Shumard Sash Balance.

An article that entirely dispenses with Weights, Cords and Pulleys. Requires no boxes in Window Frames. Can be attached to any window, old or new. Holds the Sash at any height desired, and requires but a slight pressure to move it up or down. Are easily attached by an ordinary carpenter. Are the only durable, practical substitute for weights, and are appreciated on sight. Send for circular.

SHUMARD SASH BALANCE CO.,

Richmond, Ind.

IRELAND MFG. CO., Cincinnati, Ohio,

SOLE MANUFACTURERS OF

THE MORRIS PAT. SASH LOCK,

THE MORRIS PAT. DOOR KNOB,

And REVERSIBLE RABBETED MORTISE DOOR LOCK.

PATENT PENDING.

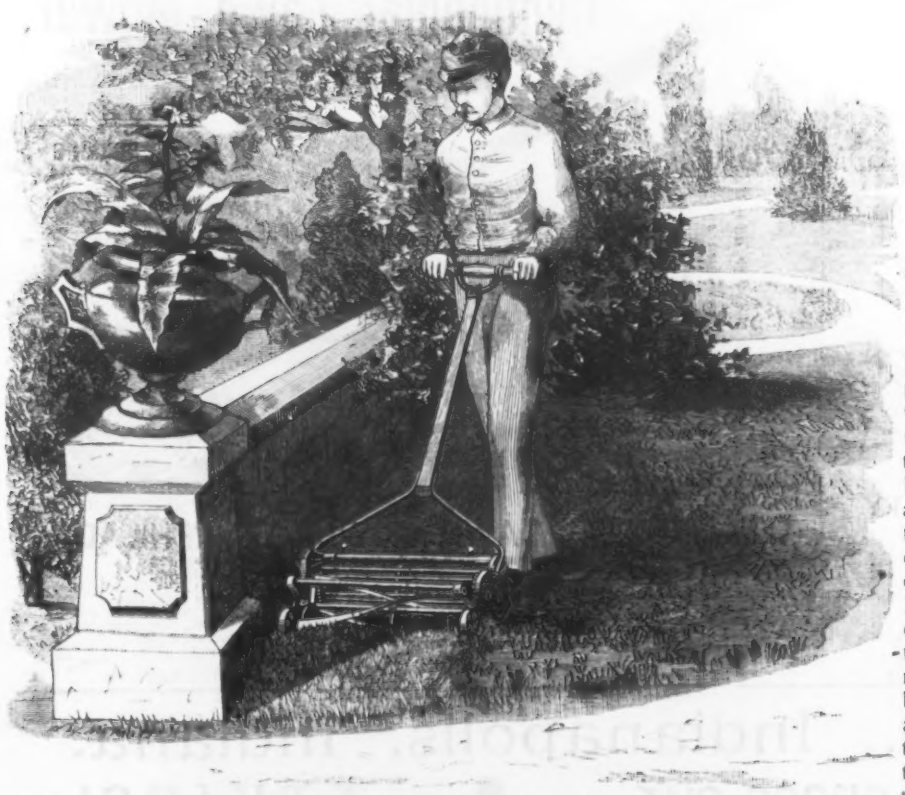
Also General Line of Builders' Hardware.

Catalogues and Lists Furnished on Application.

THE "NEW EASY" LAWN MOWER,

MANUFACTURED BY

Blair Manufacturing Co., Springfield, Mass., U. S. A.



SPECIAL ADVANTAGE, No. 1.

The "NEW EASY" is the *only* Lawn Mower that will cut to within *one inch* of walls, fences, shrubbery, around trees, &c. (See above cut).

To the Hardware AND Agricult'l Imolement Trade.

Special Notice.

Do you want to handle the Lightest Running, Easiest Cutting, BEST SELLING Lawn Mower in the market? If you do, examine carefully the merits of the "NEW EASY," and you will know what Mower to buy. No Lawn Mower has yet been made that approaches so near to the ideal Machine for every kind and variety of work as the "NEW EASY." It stands pre-eminent and alone as the only perfect Mower manufactured, and combines the characteristic and exclusive advantages of the front-cut, traction-roller style of machine — viz., adaptability to every grade of lawn work, with extreme ease of operation.

SPECIAL ADVANTAGE, No. 2.

The "NEW EASY" is the *only* Lawn Mower that will run off its level and cut low terraces, mounds, flower beds, &c. (See above cut.)

SPECIAL ADVANTAGE, No. 3.

The "NEW EASY" is the *only* Lawn Mower with sufficient traction to cut high terraces with rope attachment. (See above cut.)

Herewith are illustrated a few of the *special* uses to which the "NEW EASY" is adapted, and that are not possessed or claimed for any other Mower, while for general purpose work it is *Chief of the best.*

Notice the "New Easy" Lawn Mower and What We Claim for It.

We do not advertise the "NEW EASY" as a Field Mower, nor assert that it will cut grass 12 inches high with perfect ease; but for a Lawn Mower, Strong, Durable, Easily Sharpened and Adjusted, of Varied Capacity, Graceful Form, Long and Pleasing Service, and so easily operated that a lady or child may use it without fatigue, we *do* claim the "NEW EASY" to be without a rival; and our Agents are authorized to sell this Mower with the express guarantee that these claims shall be verified by trial.

SPECIAL ADVANTAGE, No. 4.

The "NEW EASY" is the *only* Lawn Mower that will cut *narrow borders.* (See above cut.)

The "Bay State" Lawn Mower.

The Lightest and Quietest Running, Best Constructed, Handsomest and Most Durable Rear-Cut, Side-Wheel Mower Made!

Guaranteed first class in every respect, and superior to any other machine of this style in the market.

Four Sizes, 12 in., 14 in., 16 in., 18 in.

Every Mower unconditionally warranted. Made in Seven Sizes. 10 in. to 24 in. All for hand use.

Catalogues and Price Lists of our Lawn Mowers, with discounts to the Trade, furnished on application to any of the following

WHOLESALE AGENTS:

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Parker & Wood, Boston, Mass.
L. M. Rumsey Mfg. Co., St. Louis, Mo.
Charles M. Ghriskey, Philadelphia, Pa.
E. S. Bristol & Gale, Chicago, Ill.
Samuel G. B. Cook & Co., Baltimore, Md.
Rice, Born & Co., New Orleans, La.
Bubl, Sons & Co., Detroit, Mich.
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George Worthington & Co., Cleveland, Ohio.
Bostwick, Braun & Co., Toledo, Ohio.
John Patterson, Columbus, Ohio.
George W. Rouse & Son, Peoria, Ill.
Stewart & Montgomery, Rock Island, Ill.
A. D. Perry & Co., Syracuse, N. Y.
Corning & Co., Albany, N. Y.
Howe & Co., Troy, N. Y.
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E. D. Carter, Erie, Pa.
Lindsay Brothers, Milwaukee, Wis.
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Horsley & Burck, Galveston, Texas.
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W. F. Lake, Fort Worth, Texas.
Lewis & Scott, Denver, Col.
Low & Clasbey, Salt Lake City, Utah.
John Agnew, Columbia, S. C.
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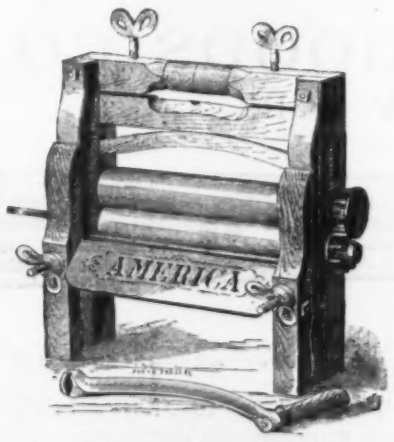
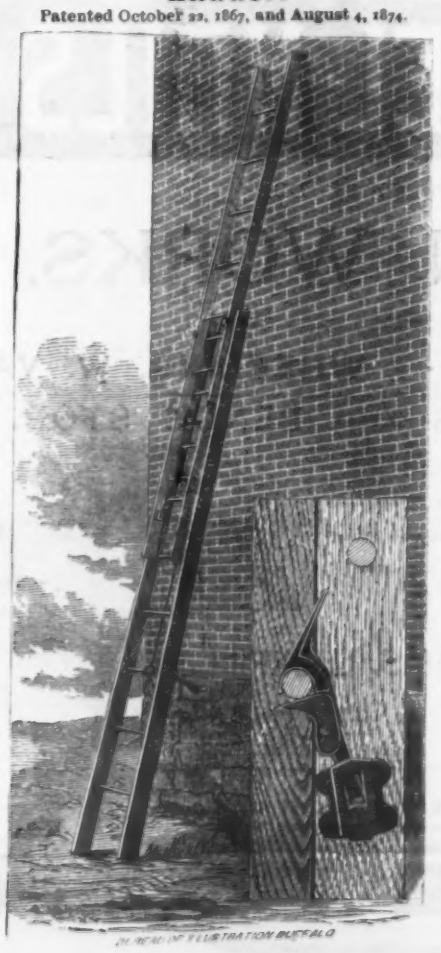


Lovell's Patent Extension Ladder.

Patented October 23, 1867, and August 4, 1874.



The Adams Iron Wheel Truck.

Pat. September 11, 1883.

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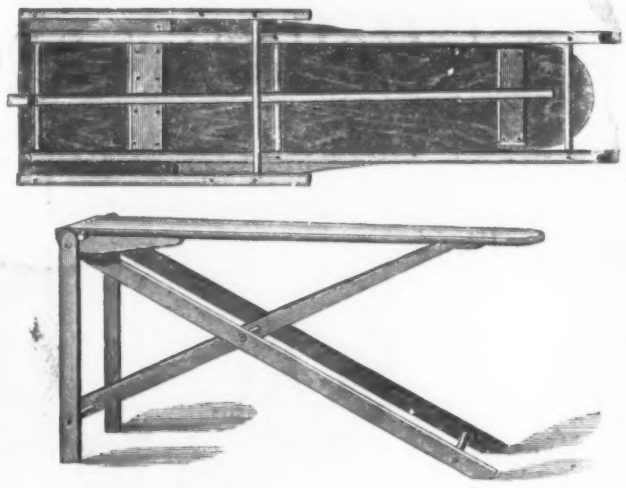

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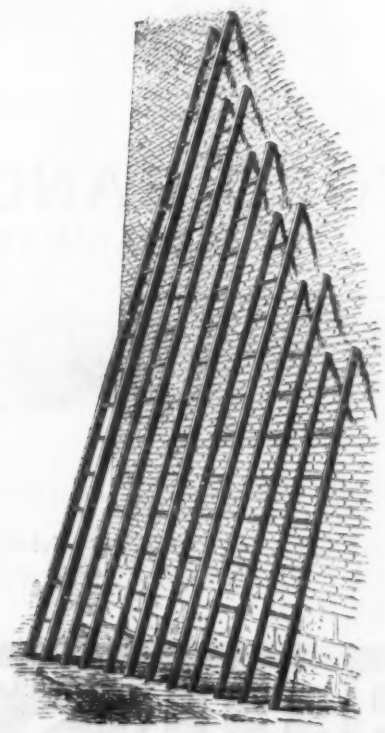

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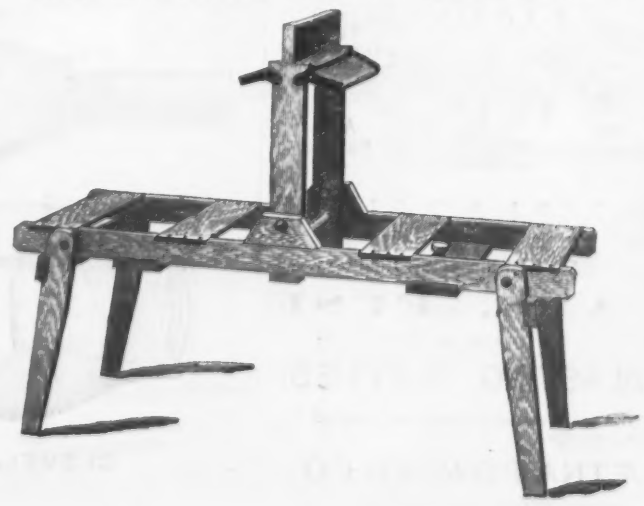

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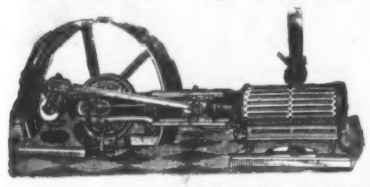

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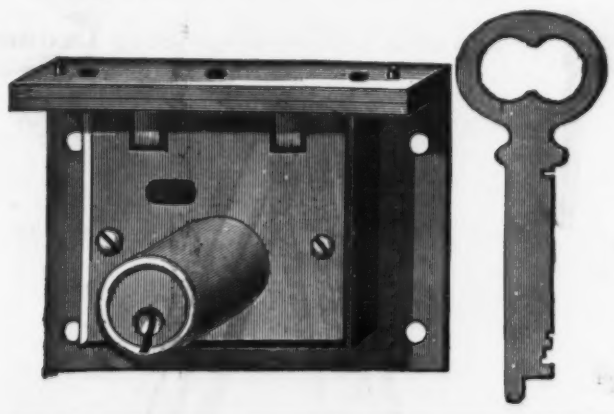

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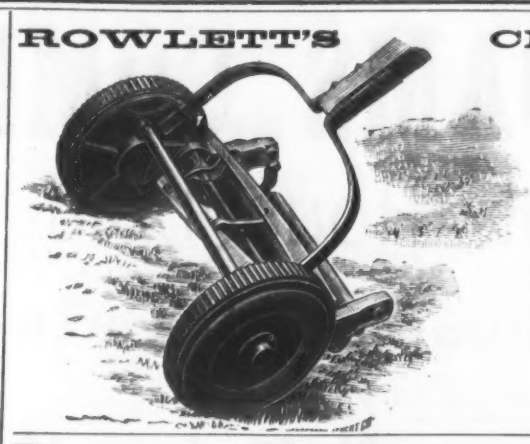

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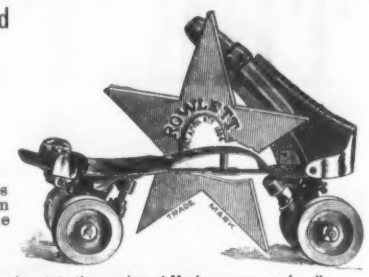

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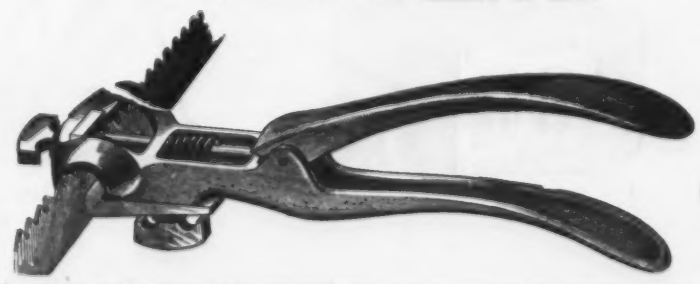

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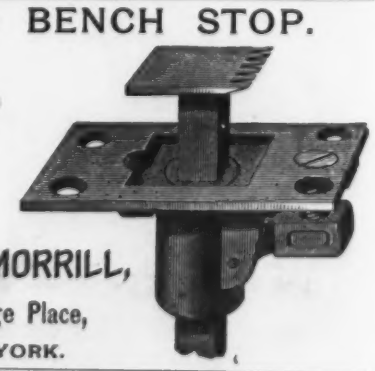

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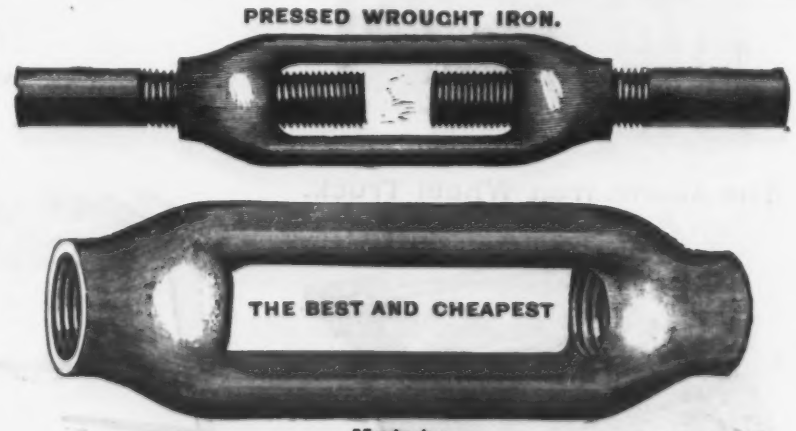

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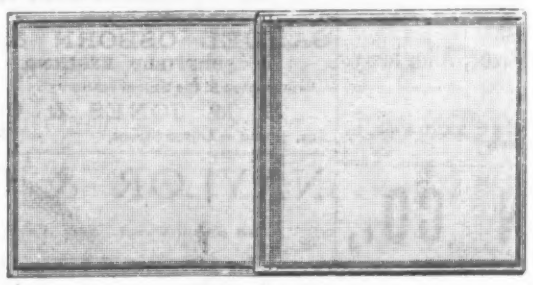

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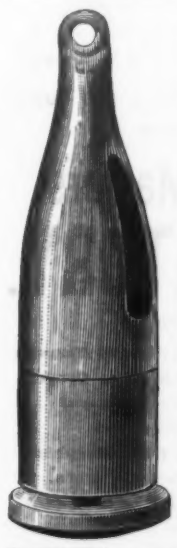

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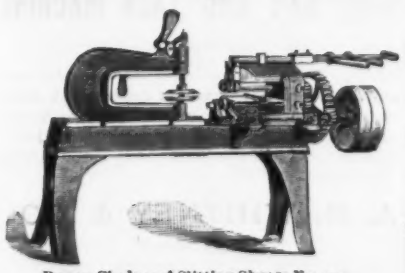

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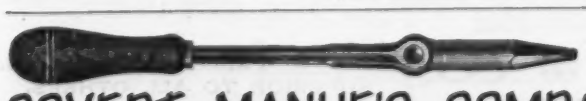

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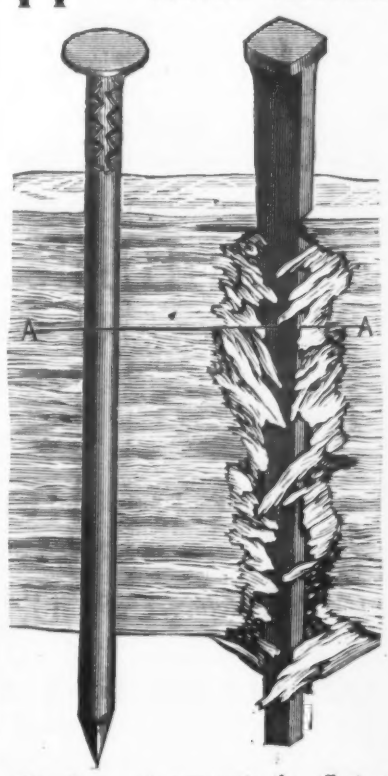

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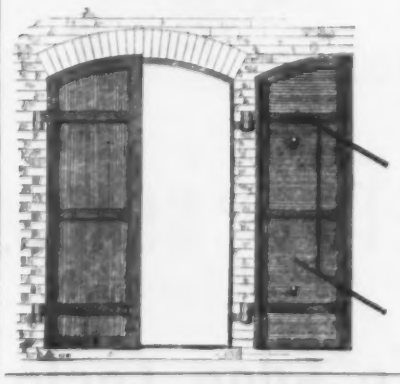

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Warranted Best Cast Steel

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"CHOICE" EXTRA NEEDLE WIRE.

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FOR

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Turns out at least DOUBLE WORK by increased speed and feed, and CUTS HARDER METALS than any other Steel. Neither hardening nor tempering required.

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Iron Ores, Bessemer Pig Iron,
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Steel and Iron Wire Rods,
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Scrap Steel, Rail & Bloom Ends,
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Iron and Steel Beams,
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Steel Blooms, Slabs, Bars, and Hoops,
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Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

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HAVING STOOD THE TEST OF 130 YEARS COMPETITION, THEY ARE IN HIGHER REPUTE THAN EVER.

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— ARE USED IN ALL —

THE PRINCIPAL SLAUGHTERING AND MEAT PACKING ESTABLISHMENTS OF THE UNITED STATES OF AMERICA, & THE AUSTRALIAN COLONIES;

AND, WITH HIS EQUALLY CELEBRATED **SHOE KNIVES** HAVE FOUND THEIR WAY, AND CARRY HIS TRADE MARK INTO ALL THE COMMERCIAL MARKETS OF THE WORLD.

BEWARE OF CLOSE IMITATIONS OF THE KNIVES; ALSO OF COUNTERFEITS OF THE MARK, AS BOTH HAVE BEEN, AND ARE, FREQUENTLY ATTEMPTED.

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SHEET IRON AND SHEET STEEL,

COMMON OR SMOOTH FINISH.

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ROOFING, CEILING AND SIDING,

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PERRINE PATENT

Curved Blade HOE Double Shank

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BLOOMS, BILLETS AND SLABS.

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Butchers' Cleavers,
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SEE PAGE 3.

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KEEPS OUT COLD, WIND, SNOW, RAIN AND DUST.

Saves Fuel. Secures Comfort.

Only 10 Cents a Yard.

After EIGHT YEARS' test on the market, leads all competitors as the finest article, easiest to handle and gives best satisfaction. For sale by the leading Hardware Dealers all over the United States. Send for samples, circulars and discounts.

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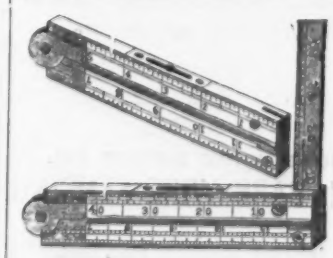

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Yacht Fixtures, Nickel-Plated Canoe Trimmings, Cheapest and Best Side Lights in the Market, Awning Hardware. Specialties in Brass made to Order.

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WIRE STAPLES

IN EVERY VARIETY

Chisel & Lancet or Boardman Point,
Blind Staples a Specialty.

Send for Samples and Prices.

BINGHAMTON STAPLE WORKS

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THE AMERICAN WIRE NAIL AND TACK MACHINE

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Claims advantages over other machines for general simplicity, adjustment of cutters, both vertically and horizontally, greater gripping power through use of compound levers, positive adjustable knock-off, uniform feed and automatic barbing attachment.

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PATENT STEEL

Toe Calks,

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SUPERIOR TO ALL OTHERS.

If your Hardware Merchant does not keep it, send $2.50 to the manufacturer, who will forward it by mail. Liberal Discount to the Trade. Send for Circular

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CALIPERS and DIVIDERS.

Some of the points wherein our goods are superior to all other Spring Calipers.

1.-Evenness of tension. The legs when open to their fullest capacity have as much spring tension as when shut.
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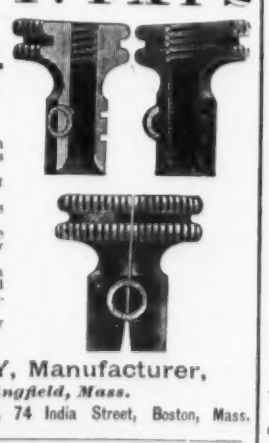

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BEST SELLING TOOL ON EARTH

CLOD CRUSHER AND LEVELER

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COMPLETE AND PERFECT ELECTRIC LIGHTING SYSTEM,

For Central Stations or Isolated Plants. All kinds of Electrical Apparatus and Supplies.

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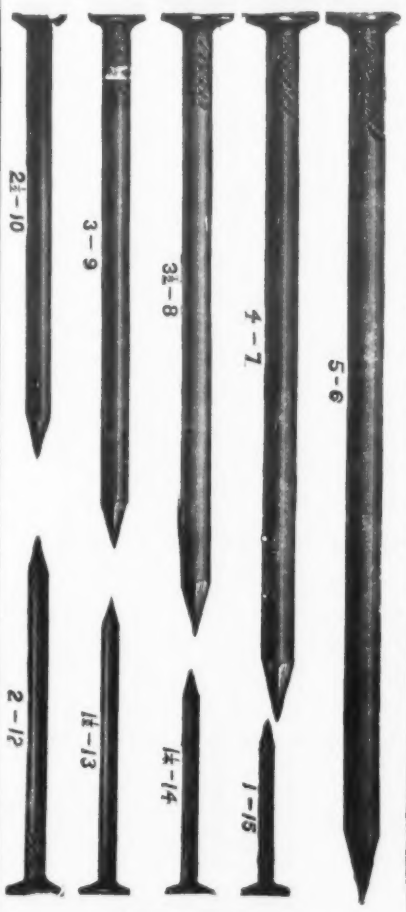

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OF ALL KINDS

Barbed or Plain Steel, Iron and Brass Nails. Cast Steel Wire Brads, Cast Steel Wire Finishing Nails, Cigar Box Nails, Escutcheon Pins, Wagon Nails, Clinch Nails, Hinge Nails, Wire Spikes for Track, Bridge and Dock Work, Tinned Nails, Galvanized Nails

FINE GARDEN TOOLS.

THE PEERLESS RAKE.

PATENTED

In 12, 14 and 16 Tooth Sizes.

Made from a Solid Bar of Steel. No Iron. No Welding.

"IOWA" SOLID BLADE WEEDER.

Teeth and Blade Solid Steel. No Welding. These Tools possess merit and are beautifully finished.

MADE EXCLUSIVELY BY

The IOWA FARMING TOOL CO.,

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CHAMPION IRON FENCE CO.,

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Largest Iron Fence and Railing Works in U. S.

SPECIALTIES—Iron Stairs and Jail Work, Builders' and Ornamental Iron Work, and the only manufacturers of Malleable Iron Cresting, guaranteed against breakage; also manufacturers of the Celebrated Ohio Champion Iron Force and Lift Pumps. Send for 150-page Catalogue

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Every season we hear of dealers and users seeking this Hoe and not finding it. It is to be had from us when it cannot be obtained to advantage nearer by.

"The best Hoe I ever used," is said to us over and again.

Nothing equal to it in the market for many uses.

Made in Three Sizes and of the best material and workmanship.

SEND FOR CIRCULAR AND PRICES.

MADE ONLY BY WITHINGTON & COOLEY MFG. CO.,

Makers of Hoes, Forks, Rakes and Snaths, JACKSON, MICH.

GIBBS' GENERAL PURPOSE RAKE.

NEW, NEAT AND NOVEL.

As a Lawn or General Purpose Rake it has no Equal.

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It Sells on Sight and Cannot Fail to Please.

GIBBS' POST HOLE DIGGER. (PATENTED.)

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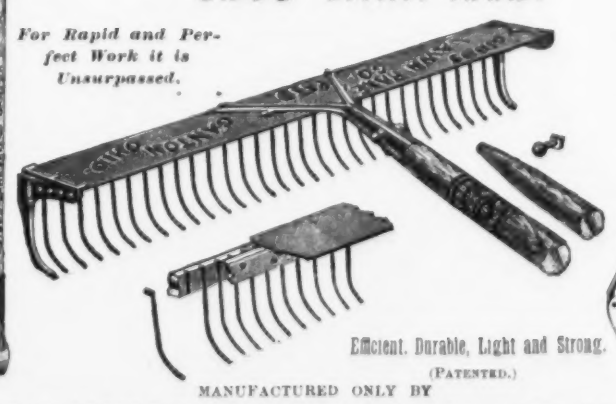
For Rapid and Perfect Work it is Unsurpassed.



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LATEST AND BEST. THE ONLY SUCCESSFUL SINGLE BLADE DIGGER IN THE WORLD.

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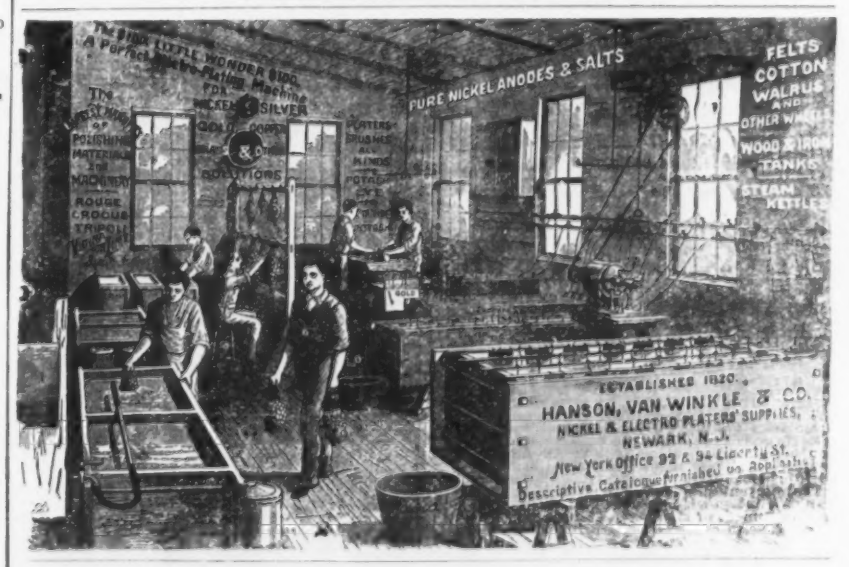

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Burglar-Proof Sash Lock

AND

Automatic Window Holder.

Cheapest, Strongest and Only Practical Automatic Lock and Holder on the Market.

SAMPLES FREE TO THE TRADE.

J. R. CLANCY, Syracuse, N. Y.

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Lloyd & Supplee Hardware Co.
Terms, 30 days. For 60 or 90 days, interest added at 8 per cent. per annum.

Anvils.
Peter Wright's, ₱ ℔ .....9¾ @ 10¢
Trenton .....9½¢
Eagle Anvils, American, 10¢ .....dis. 20 %
Apple Parers.
Penn Apple Parers .....$5.00 net
White Mountain 5.00
Lots of 10 to 25 dozen, special prices.
Axes.
Hunt's Kentucky and Yankee, ₱ doz. net $7.00
William Mann, ₱ doz. net 7.00
Favorite ₱ doz. net 6.00
Beveled Axes .....add 50¢
Double Bit Axes. net $12.00
Augers and Auger Bits.—New List January 7 1880.
Snell's Augers and Bits .....dis. 60@60&5 %
New Haven Copper Company .....dis. 60&10&5 %
Benjamin Pierce Auger Bits .....dis. 40 %
Jennings' Auger Bits, new list, Jan. 1, 1884..dis.. 25 %
Cook's Auger Bits and Augers .....dis 55 %
Snell's Ship Augers .....dis 15 @ 20 %
Watrous' Ship Augers .....dis. 15 @ 20 %
Bonney's Pat. Hol. Augers, list $48 ₱ doz dis...40&10 %
Stearns' Pat. Hol. Augers, list $48 ₱ doz...dis. 20&10 %
Balances.
Light and Common .....dis. 50 %
Bells.
Bevin Bros. Mfg. Co. Light Hand Bells dis. 75&10@80 %
Light Hand Bells .....80&5 %
Swiss Pattern Hand Bells .....60 %
Connell's Door Bells .....dis. 20&10 %
Gt. Western & Kentucky Cow, new list .....dis. 70 %
Boring Machines
Upright, without Augers.....List, $5.50 } .....dis. 50 %
Angular, without Augers.....List, 6.75 }
Bolts.—Eastern Carriage Bolts, new list, June 10, 1884 .....dis 75&10&5@80 %
Phila. Carriage Bolts new list..dis 75&10@75&10&5 %
Stanley, Wrought Shutter .....dis. 60&10 %
Braces.—Barber's Improved .....dis 50 %
Barber's Old Style .....50&10 %
Backus, Polished .....dis 60@60&10 %
Backus, Nickeled .....dis. 50&10@60 %
Spofford .....dis 50&5@50&10 %
American Ball .....dis. 55&10 %
Amidon Improved .....dis. 60@60&10&5 %
Amidon Corner Brace .....dis. 40@40&10 %
Butts.
Cast Fast Joint, Narrow .....dis. 60&10@60&10&10 %
Cast Fast Joint, Broad .....dis. 66&10 %
Cast Loose Joint, Narrow .....dis. 70&10@70&10&5 %
Cast Loose Joint, Broad .....dis. 70&10@70&10&5 %
Cast Acorn, Loose Pin .....dis. 70&10@70&10&5 %
Cast Acorn, Japanned .....dis 70&10@70&10&5 %
Cast Mayer's Loose Joint .....dis 70&10@70&10&5 %
Wrought Loose Pin.....dis. 60&10&10@60&10&10&5 %
Wrought Table Hinges and Back Flaps..dis. 60&10 @ 60&10&10 %
Wrought Loose Joint..dis. 60&10&10@60&10&10&5 %
Wrought Narrow Fast .....dis. 60&10 @ 60&10&10 %
Blind Butts.
Parker .....dis. 75&2 %
Clark .....dis. 80 %
Shepard .....dis. 75&10&5 @ 80 %
Lull & Porter .....dis. 80&10 %
Huffer's .....dis. 50 %
Casters.—Bed (new list July 1, 1880) Plate .....dis 60 %
Chains.—German Halter and Coil, list June, 1884 .....dis. 55 @ 55&5 %
Galvanized Pump .....₱ ℔ 5½@6¢
Best Proof Coil Chain—English.

₱ ℔	9¼	6¾	5¾	5½	5	4¾
	3-16	¼	5-16	⅜	7-16	½

Chisels.—Socket Framing .....dis 75&10@75&10&5 %
Socket Firmer .....dis 75&10@75&10&5 %
Butcher's .....$5.00@$5.25 to £ gold
Coffee Mills.—Box and Side (new list Jan. 1, 1880 .....dis 45&10 %
Enterprise .....dis 20&10@30 %
Cutlery.—Walden Pocket .....new list net
Pennsylvania Knife Co .....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.
Door Hangers.—Cronk Barn Door Hangers...No. 4, $12.00; No. 5, $14.00; No. 6, $18.00.dis. 50&5@50&10 %
American Parlor Door Hanger .....$6.00 ; dis 20&10 %
Drawing Knives.
Hart Mfg. Co.'s .....dis. 75&10&5 %
Adjustable Handle .....dis 20@25 %
Fry Pans.
Tinned .....dis 45 %

₱ doz....	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No.......	0	1	2	3	4	5	6	7	8

Burnished .....dis 70 %

₱ doz....	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
No.......	0	1	2	3	4	5	6		8

Files.
Nicholson .....dis 55@55&5 %
Disston .....dis 55@55&5 %
Butcher .....
Crown and Arrow .....60&5@60&10 %
Fluting Machines.
Eagle—3¼ in. roll .....each, $2.15 } dis 35 %
Eagle—5¼ in. roll .....each, 2.85 }
Crown—4½ in. roll .....each, 3.50 }
Crown—6 in. roll .....each, 4.00 } dis 35 %
Crown—8 in. roll .....each, 6.50 }
Geneva Fluter .....dis 25 %
Favorite com. Fluter and Sad Iron..₱ doz., $10.50 net
Hammers.
Yerkes & Plumb's, new list .....dis 40&5 %
Maydole Hammers, new list .....dis 25@25&10 %
Howell A. E. Nail Hammers .....₱ doz., net $3.75
Handles.
Disston Loop Handles Cross-Cut .....33¢ pair net
Boynton Loop Handles Cross-Cut .....20¢ pair net
Hatchets.
Yerkes & Plumb, new list .....dis 40&10 %
Hunt .....dis 40 %
Hay and Straw Knives.
Lightning .....₱ doz., $18.00 dis. 20 %
Electric .....₱ doz., $12.00 net
Wadsworth .....₱ doz., net dis 35&5@40 %
Walton Straw Knives .....₱ doz., net 17.00
Gem Hay Knife .....₱ doz $18 ; dis 20 %
Hinges.
Strap and T .....dis 65&5 %

Horse Nails. Nos.	5	6	7	8	9	10	
Globe	26	23	21	20	19	18	dis 10&5&5 %
Ausable	30	27	25	24	23	22	dis 25&10 %
Pol'ed and P't'd & Blued & P't'd.	31	28	26	25	24	23	dis 25&10 %
Clinton		23	21	20	19	18	dis 25&10 %
" Pol'ed & P't'd.		24	22	21	20	19	dis 25&10 %
Saranac	26	23	21	20	19	18	..dis 25@30 %

Locks and Knobs.
Branford Locks .....dis 50&2 %
Parker's Cabinet .....dis 40&2 %
American Padlocks .....dis 70@70&10 %
Scandinavian Padlocks .....dis 50 %

₱ doz..	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	dis 60 %
No......	57	58	59	60	61	62	63	
₱ doz.		$18.00		26.00		33.00		dis 60 %
No.		64		65		66		

Lanterns.
Buckeye .....large list, net ; small list, net
Tubular, No. 0, $6.75@7.00; No. 1, $8.25@8.50 ₱ doz. net
Guards 40¢ extra.
Lawn Mowers.—Pennsylvania } dis 50 %
Philadelphia
Excelsior
Continental
Quaker City
Lawn and Garden Pumps.
Holland Patent .....list, $5.00, dis 10 %
Mattocks.
Long and Short Cutter .....new list, 60&10 %
Pennsylvania Pattern .....dis 60& 10 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.dis. 20&10 %
Stebbins' Gates .....dis. 70&10 %
Lincoln's Gates .....dis. 70&10 %
Landers, Frary & Clark's Petroleum .....dis 33⅓&10 %
Brass Liquor Cocks new list Jan. 1, 1880.dis.. 65&5 %
Cork Lined Cocks .....dis. 70 %
Meat Cutters.
Dixon's .....dis. 40 %
Woodruff .....dis. 40 %
Stowe .....dis. 40 %
Hale's .....new list, dis. 60&10&10 %
American .....dis 35 %
Stuffers .....dis. 40 %
Enterprise Stuffers .....dis. 20&10 %
Planes.—Sandusky Tool Co .....dis. 20&2 %
Ogonts .....dis. 25&2 %
Ohio and Auburn .....dis. 20&2 %
Bailey (S. R. & L. Co.) .....dis. 20&10 %
Plane Irons.—Ohio Tool Co .....dis. 20&10 %
Butcher's .....$5.00 @ 5.25 to £
Plumbs and Levels.
Stanley's Adjustable .....dis. 70&10 %
Stanley's Non-Adjustable .....dis. 70&10 %
Picks.—New list .....60 %
Razor Strops.
Lamont Combination .....₱ doz. $4.00
Lamont Combination .....1 gross lots $42.00
Imitation Emerson .....₱ doz.$2.00. 70&10&10 %
Rules.—Stanley Boxwood .....dis. 80&5@80&10 %
Stanley Ivory .....dis. 55 @55&10%
Steelyards.—Hart's Pattern dis .....40&10@50 %

Per doz......	$14.50	17.75	21.00	26.50	31.00	35.50
Lbs...........	50	100	150	200	250	300

American Pattern .....dis. 40&10@50 %

Per doz......	$8.00	10.25	13.75	15.60	16.75	19.50
Lbs...........	50	100	150	200	250	300

Scale Beams .....60&5@60&10%
Custers .....25 %
Squares.
Steel and Iron.dis. 60&10 % ; full cases dis .....70&10@70&10&10 %
Try Squares, Stanley .....dis 60&10 %
Disston's Try Squares .....dis 45&10 %
Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened .....₱ doz $7.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened .....₱ doz $6.70 net
Saws.—Disston's Hand, Panel and Rip....dis 20&10 %
Disston's Circular .....dis 45&10 %
Cross-Cut No. 2, Plain Tooth .....dis 45&10 %
Cross-Cut Patent Tooth .....dis 45&10 %
Cross-Cut Champion Tooth .....dis 45&10 %
Shovels and Spades.
Oliver Ames & Sons, new list .....dis 20 %
Griffiths .....dis 50&10@60 %
Rowland .....dis 60@60&5 %
Sad Irons.—4 to 10 ℔ .....₱ ℔ 2.35@2.50¢
Mrs. Potts' Patent .....dis 35@40 %
Stone.
Washita Extra .....₱ ℔ 30¢
Washita No. 1 .....₱ ℔ 25¢
Washita No. 2 .....₱ ℔ 20¢
Washita Slips .....₱ ℔ 50¢
Washita Axe .....₱ ℔ 15¢
Hindostan Oil Stone No. 1 .....₱ ℔ 4½ %
Hindostan Axe Stone .....₱ ℔ 5¢
Hindostan Slips .....₱ ℔ 8¢
Screws.—Parker List.
Flat Head Iron .....dis 83⅓ %
Flat Head Brass .....dis 83⅓ %
Round Head Brass .....dis 81½ %
Round Head Iron .....dis 81½ %
Spoons.
Plated .....dis 50&10@60 %
German Silver .....dis 40&10@50 %
Britannia, Boardman's .....dis 60 %
Britannia, Parker's .....dis 60&10 %
Tinned .....dis 10 %
Springs.—Torrey .....dis 50 %
Gem No. 3 small Japanned .....$2.00 } dis 50&10 %
Gem No. 2 medium Japanned .....2.75 }
Coil No. 10 ₱ gross net .....$5.50@6.00
Other Standard Springs .....dis 50&10@60 %
Warner Door Springs, ₱ doz. $2.50 .....dis 40&10 %
Standard Spring Hinges—
Single No. 0, ₱ doz. net .....$1.10@1.25
Single No. 1, ₱ doz. net .....1.25@1.50
Other Standard Spring Hinges .....dis 25&10@40 %
Stocks and Dies. .....dis 15&10@25 %
Stove Polish.—Gem .....₱ gross, $4.50, dis 12½ %
Dixon .....6.00, dis 10 %
Fire Fly .....$3.00 gross, net
Tacks. .....Combination discounts
Shoe Nails—4-8, and over, 5½¢ } 10 %
Shoe Nails—3½-8, and under 7¢ }
Double Pointed Tacks .....dis 80 %
Traps.
Genuine Oneida—Newhouse .....dis 35 %
Im. Oneida—Newhouse list. First qual.dis 60&10&10 %
Vises.—Solid Box. Trenton new list..dis 50&10@60 %
Wrenches.—Agricultural .....dis 75&10&5 %
Coes' Genuine .....dis 60&3 %
Coes' Mechanics' .....dis 60&10&3 %
Coes' Mechanics,' Mall. Bar .....dis 80 @ 80&5 %
Wire.
Bright or Annealed, No. 0 to 18 .....dis 65&5 %
Bright or Annealed, No. 19 to 26 .....dis 70 %
Bright or Annealed, No. 27 to 36 .....dis 70 %
Coppered, 0 to 18 .....dis 65 %
Tinned Broom Wire .....dis 65 %
Galvanized Barb Wire .....5½¢
Painted Barb Wire .....4½¢
Galvanized, No. 7 to 18...Market List, dis .....50 %
Wringers.
Peerless No. 2½ $30.00
Peerless No. 2 .....33.00
Universal No. 2½ 30.00
Universal No. 2 .....33.00
Novelty No. 2, for common tubs 30.00
Novelty No. 3, " " 34.50
Excelsior E, for stationary tubs 39.00
Excelsior F " " 43.50
(dozen lots $3.00 @ 4.00 off.)

PITTSBURGH.

Merchant Iron.

Terms.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 ₱ cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
1¼ to 4 by ⅜ to 1 inch .....2.0¢
4¼ to 6 by ⅜ to 1 " .....2.1¢
1¾ to 6 by 1⅛ to 1½ " .....2.4¢
1¼ and 1⅜ by ⅜ to ¾ " .....2.1¢
1 and 1⅛ by ⅜ to ¾ " .....2.2¢
⅝, ¾ and ⅞ by ⅜ to ⅝ inch .....2.4¢

Rounds and Squares.

1 to 1⅝	2.0¢	⅜ to 9-16	2.2¢
2 to 2⅝	2.2¢	½ to 7-16	2.4¢
2¾ to 3¼	2.5¢	⅜	2.6¢
3⅜ to 4	3.0¢	5-16	2.8¢
4¼ to 5	3.5¢	¼	3.0¢
¾ to ⅞	2.1¢	3-16	5.0¢

Oval Iron.

⅞ to 1½	2.4¢	⅝	2.8¢
⅝ to ¾	2.6¢	½	3.2¢

Half Oval and Half Round.

⅞ to 1¼ inch	2.7¢	½ inch	3.5¢
⅝ to ¾ "	3.2¢	⅜ "	5.0¢

Horse Shoe.
⅝ to 1¼ by 5-16 to ⅞ inch .....3.0¢

Wagon Box Iron.
⅞ inch, Nos. 13 and 14 .....3.2¢
⅞ " " 11 and 12 .....3.0¢
¾ " " 13 and 14 .....3.5¢
¾ " " 11 and 12 .....3.3¢
⅝ " " 13 and 14 .....3.9¢
⅝ " " 11 and 12 .....3.6¢

Heavy Bands.
3½ to 6 by ¼ and 5-16 inch .....2.2¢
1½ to 3¼ by ¼ and 5-16 " .....2.2¢
1 to 1⅜ by ¼ and 5-16 " .....2.3¢
¾ to ⅞ by ¼ and 5-16 .....2.5¢
⅝ and ⅝ by ¼ and 5-16 " .....3.0¢

Light Bands.
1½ to 6 by ⅛ to 3-16 .....2.5¢
1½ to 6 by Nos. 11 and 12 .....2.6¢
1 to 1⅜ by ⅛ to 3-16 .....2.6¢
1 to 1⅜ by Nos. 11 and 12 .....2.7¢
⅞ and 13-16 by ⅛ to 3-16 .....2.9¢
⅞ and 13-16 by Nos. 11 and 12 .....3.0¢
¾ and 11-16 by ⅛ to 3-16 .....3.2¢
¾ and 11-16 by Nos. 11 and 12 .....3.3¢
⅝ and 9-16 by ⅛ to 3-16 .....3.5¢
⅝ and 9-16 by Nos. 11 and 12 .....3.6¢
½ inch by ⅛ and 3-16 .....3.8¢
½ inch by Nos. 11 and 12 .....3.9¢

Hoop Iron.
1¼ to 4, Nos. 13, 14 and 15 .....2.8¢
1¼ to 2, Nos. 16, 17 and 18 .....2.9¢
1¼ to 2, No. 19 .....3.0¢
1¼ to 2, No. 20 .....3.1¢
1¼ to 2, No. 21 .....3.2¢
1¼ to 2, No. 22 .....3.3¢
15-16, 1, and 1⅛, Nos. 13, 14 and 15 .....3.0¢
15-16, 1, and 1⅛, Nos. 16, 17 and 18 .....3.1¢
15-16, 1, and 1⅛, Nos. 19 and 20 .....3.2¢
15-16, 1, and 1⅛, No. 21 .....3.3¢
15-16, 1, and 1⅛, No. 22 .....3.4¢
⅞, Nos. 13, 14 and 15 .....3.2¢
⅞, Nos. 16, 17 and 18 .....3.3¢
⅞, Nos. 19 and 20 .....3.4¢
⅞, No. 21 .....3.5¢
⅞, No. 22 .....3.6¢
13-16, Nos. 13, 14 and 15 .....3.4¢
13-16, Nos. 16, 17 and 18 .....3.5¢
13-16, Nos. 19 and 20 .....3.6¢
13-16, No. 21 .....3.7¢
13-16, No. 22 .....3.8¢
¾, Nos. 13, 14 and 15 .....3.5¢
¾, Nos. 16, 17 and 18 .....3.6¢
¾, Nos. 19 and 20 .....3.7¢
¾, No. 21 .....3.8¢
¾, No. 22 .....3.9¢
11-16, Nos. 13, 14 and 15 .....3.7¢
11-16, Nos. 16, 17 and 18 .....3.8¢
11-16, Nos. 19 and 20 .....3.9¢
11-16, No. 21 .....4.0¢
11-16, No. 22 .....4.1¢
⅝, Nos. 13, 14 and 15 .....3.9¢
⅝, Nos. 16, 17 and 18 .....4.0¢
⅝, Nos. 19 and 20 .....4.1¢
⅝, No. 21 .....4.2¢
⅝, No. 22 .....4.3¢
⅝, No. 23 .....4.4¢
9-16, Nos. 13, 14 and 15 .....4.1¢
9-16, Nos. 16, 17 and 18 .....4.2¢
9-16, Nos. 19 and 20 .....4.3¢
9-16, No. 21 .....4.4¢
9-16, No. 22 .....4.5¢
9-16, No 23 .....4.6¢
½ inch, Nos. 13, 14 and 15 .....4.3¢
½ inch, Nos. 16, 17 and 18 .....4.4¢
½ inch, Nos. 19 and 20 .....4.6¢
½ inch, No. 21 .....4.7¢
½ inch, No. 22 .....4.8¢
½ inch, No. 23 .....4.9¢

The prices under Hoop Iron do not apply to Cotton Ties.

1-10¢ ₱ ℔ extra will be charged for each gauge lighter than the lightest indicated.

1-10¢ ₱ ℔ extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
9 to 11 ℔, ₱ set of 6 hoops .....3.0¢
8 ℔ and less than 9 ℔, ₱ set of 6 hoops .....3.1¢
Less than — ℔, ₱ set of 6 hoops .....3.2¢

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire .....1.10¢

Tank Iron.
No. 9 and heavier .....2.8¢
Plow Slabs .....3.0¢
Plow Wings .....3.3¢

Sheet Iron.

	Common.	Charcoal.	Juniata.
Nos. 10 to 14	3.0¢	4.5¢	6.0¢
Nos. 15 to 17	3.3¢	4.8¢	6.3¢
Nos. 18 to 21	3.6¢	5.1¢	6.6¢
Nos. 22 to 24	3.8¢	5.3¢	6.8¢
Nos. 25 and 26	4.0¢	5.5¢	7.0¢
No. 27	4.2¢	5.7¢	7.2¢
No. 28	4.6¢	6.1¢	7.6¢

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10¢ extra.

Wood's Patent Planished Sheet.
1st quality (A) .....10¢ | 2d quality (B) .....9¢

Galvanized C. H. B.—(Charcoal Hammered Blooms.)

Nos. 14 to 20	12¢	No. 27	15¢
Nos. 21 to 24	13¢	No. 28	16¢
Nos. 25 and 26	14¢	No. 29	18¢

57½ @ 60 % discount.

Coal Screen Iron.
1⅛ by ⅝ by 5-16 .....2.5¢ | 1 by ⅝ by 5-16 .....3.0¢

Angle Iron.
2¼, 3, 3½ and 4 inch .....2.8¢
1¼, 1¾, 2 and 2¼ " .....2.8¢
1½ inch .....2.9¢
1 " .....3.1¢
1⅛ by 1 inch, for Plow Handles .....3.3¢
1⅛ by ¾ " " " .....3.3¢
1⅛ by ⅝ " " " .....3.4¢

T Rail.

8 lbs. to the yard	2.4¢	20 lbs. to the yard	2.3¢
12 " "	2.3¢	28 " "	2.3¢
16 " "	2.3¢	30 " "	2.3¢

Splice Joints for 12, 16 and 20℔. Rail, 30¢ each ; 28 and 30-℔. Rail, 40¢ each ; 40-℔., 50¢ each.
3½ by ⅜ and ½ Spikes for 20 and 28-℔. Rail .....3½¢
2½ and 3 by ⅜ " " 12 and 16-℔. " .....3.5¢
2½ by 5-16 " " 8-℔. Rail .....4.0¢

Flat Rails.—Punched and Countersunk.
1½ to 2 by ½ to ⅝ inch .....2.5¢
1½ by ⅜ and 7-16 inch .....2.7¢
1¼ by ⅜, 7-16 and ½ inch .....3.0¢

Juniata Nail Rods .....6.0¢
Norway Nail Rods .....7.5¢
Guard Iron, ⅞x⅝x⅝ and ⅞x⅝x⅝ .....3.5¢
Guard Iron ⅝x⅝x9-16 and ½x⅝x⅛ .....3.7¢
Drag Bars .....2.8¢
Dropper Bars .....3.3¢
Cylinder and Landside Iron .....3.7¢
Plow Beam Iron .....3.6¢

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.
⅜ to 2 inches, inclusive .....8¢
1-16 and 2⅛ to 3 inches .....9¢
¼ and 3⅛ to 4 " .....10¢
7-32 and 4⅛ to 5 " .....11¢
3-16 and 5⅛ to 6 " .....14¢
5-32 inch .....18¢
⅛ " .....25¢
Oil Well Steel Forgings .....18¢

Machinery Steel.

	Crucible	Bessemer & Open Hearth.
Ordinary Sizes ⅜ to 2 inch Round	4¢	2½¢
5-16 and 2⅛ to 3 inches	5¢	3½¢
¼ and 3⅛ to 6 "	6¢	4½¢
7-32 inch	7¢	5½¢
3-16 "	9¢	8 ¢

Square, Flat and Octagon, ½¢ extra throughout the list.
Cut to specified lengths, ½¢ extra.

Hammer Cast Steel.
Crucible Cast Steel .....5¢
Open Hearth Cast Steel .....4¢

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	9¢	8¢	6¢	5¢

1¢ extra for each additional gauge.
Cut to multiples or specified lengths, ½¢ extra.

Miscellaneous Cast Steel.
Auger and Auger Bit .....3¢
Axle Steel for carriages and wagons .....3¢
Frog Points and Plates .....5½¢
Frog Side Bars .....5¢
Pick plain (hammered) .....5¢
Pick and Mattock, beveled (rolled .....3¢
Skate Steel .....4½¢
Table Cutlery, plain .....3½¢
Table Cutlery, beveled .....4¢
Pike and Cant Hook .....7¢
Coal and Granite Wedge .....7¢
Roller .....5½¢
Spindle, subject to Machinery classification .....5½¢
Trap Spring Steel .....6¢
Forged Crank Pins and Lathe Spindles .....7½¢
Piston Rods, plain .....4¢
Piston Rods, forged to shapes .....7½¢
Slide Bars, plain .....5¢
Slide Bars, forged to shapes .....7½¢

Plate Steel.
Shell Steel, ¼ inch thick and heavier .....3¼¢
Flange Steel, ¼ inch thick and heavier .....3¾¢
Fire Box Steel, ¼ inch thick and heavier .....4¼¢
Circulars and semi-circulars, when ordered separately, extra ₱ ℔ .....½¢
Smoke Stack, to shape .....5¢
Locomotive Tank Steel .....4¢

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8 inch and over .....
Mill Saw, 8-inch and over .....5¢
Taper, 3½-inch and over .....6¢
Horse and Shoe Rasp .....5¢

Spring Cast Steel .....4¢
Spiral, Taper, cut to lengths .....5½¢

Tire Cast Steel.
1x¼ and over .....6½¢
1x3-16, ⅞x3-16 and ¼ .....7¢
1 and 13-16x⅛ and 5-32, ¾x3-16 and 5-32 .....9¢
¾ and ⅝x⅛ and 3-32 and 12 g .....10¢
Solid Safe Cast Steel .....4¢
Three and Five Ply Cast Steel .....5¢

Agricultural Implement Cast Steel.
Fork and Rake, Crucible .....4¢
Horse Rake Steel, cut to lengths, Crucible .....5¢
Hoe, Crucible .....5¢
Corn Stalk Cutter, beveled .....4¢
Leveled Hoe and Shovel Steel in Bars .....4½¢
Crucible Plow Steel in Slabs .....4¢

Bessemer and Open Hearth.
Spring .....2 6-10¢
Spring spiral and taper, cut to lengths .....3½¢
Tire, 2-16 thick and above .....2 2-10¢
Toe Calk .....2 4-10¢
Plow .....2¼¢
Axle Billets .....2 ¢
Sleigh Shoe .....2 1-10¢
Cutter Shoe, cut to lengths and tapered .....3¢
Scythe Back Steel .....3¢
Grain Drill Bars .....2½¢
Grain Drill Points .....3½¢
Rolling Coulter Blanks, cut and punched .....6¢
Thrasher Steel .....2½¢
Thrasher Teeth .....3½¢
Rolled Hammer Billets .....2½¢
Terms.—Four months: 3 per cent. discount for cash if remitted within 30 days.

Rolls and Castings.
Furnace Floor and Straightening Plates .....1½¢
Housings and Castings not otherwise specified .....2 ¢
Guide Plates .....2½¢
Spindles and Coupling Boxes .....1¾¢
Sand Rolls and Pinions, large size .....2 ¢
Sand Rolls and Pinions, small size .....2½¢
Pipe Mill Castings .....3 ¢
Rolling Mill Castings under 50 ℔ .....2 ¢
Spur and Bevel Wheels, large .....3¢
Spur and Bevel Wheels, small .....3½¢
Pulleys up to 30 inches .....4 ¢
Pulleys over 30 inches .....3½¢
Engine Castings, light .....3¼¢
Engine Castings, heavy .....2¾¢

White and Red Lead.
Strictly Pure White Lead in Oil, in Kegs 6½¢ ₱ ℔ ; in lots of less than 500 ℔ 7 ¢ ₱ ℔ net ; in 25℔ Cans, packed in 100 ℔ cases, ½¢, and 12½ ℔ cans' 1¢ over keg price ; in 1 to 5 ℔ Cans, assorted, in 100 ℔ cases, 2½¢ over keg price.
Strictly Pure Dry White Lead in kegs, ₱ ℔ .....6½¢
Strictly Pure Red Lead *extra bright and fine*, in kegs .....6¼¢
Strictly Pure Litharge, *powdered, extra fine*, in kegs .....6¼¢
Orange Mineral, *True*, in barrels .....8¼¢
" " in 100 ℔ kegs .....8½¢
Terms : Note or acceptance at 60 days ; or less 2½ % for cash if paid within 15 days from date of invoice.
Freight equalized with all points where White Lead is made.

Window Glass.
Discount, 75% *Single Strength* 75 & 10% *Double*. Prices current, ₱ box of 50 feet.

Single Strength.

United Inches	Sizes.	AA.	A.	B.	C.
25	6 x 8 to 10 x 15	$8.75	$8.00	$7.50	$7.00
39	11 x 14 to 15 x 24	9.25	8.50	8.00	7.25
48	16 x 24 to 20 x 28	10.75	9.75	8.75	7.75
54	15 x 34 to 24 x 30	12.25	10.75	9.00	....
60	26 x 28 to 24 x 36	13.00	11.50	9.75	....
70	26 x 36 to 26 x 44	14.50	13.25	10.75	.
80	26 x 46 to 30 x 50	15.00	14.00	11.25	....
84	30 x 52 to 30 x 54	....	....	....	....
90	30 x 56 to 34 x 56	....	....	....	....
94	34 x 58 to 34 x 60	....	....	....	....
100	36 x 60 to 40 x 60	....	..	....	....
	Double Strength.				
25	6 x 8 to 10 x 15	13.25	12.25	11.25	10.50
39	11 x 14 to 15 x 24	14.50	13.25	12.50	11.25
48	16 x 24 to 20 x 28	17.25	15.75	14.00	....
54	15 x 34 to 24 x 30	19.75	17.25	14.50	....
60	26 x 28 to 24 x 36	21.00	18.50	15.75	....
70	26 x 36 to 26 x 44	23.25	21.25	17.25	....
80	26 x 46 to 30 x 50	24.00	22.50	18.00	....
84	30 x 52 to 30 x 54	25.75	23.25	19.25	....
90	30 x 56 to 34 x 56	27.75	25.00	21.75	....
94	35 x 58 to 34 x 60	29.25	27.75	24.00	.. .
	36 x 60 to 40 x 60	33.25	30.00	27.75	....

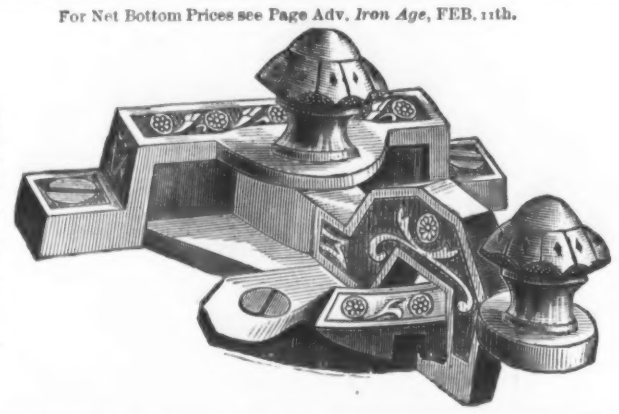
Sizes above — $10 ₱ box extra for every 5 inches.

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

Hubbard, & Co.'s Goods.
Axes, Single Bit, Lippincott .....per doz., $6.50
Axes, Single Bit, James & Co .....per doz., 5.50
Axes, Double Bit, Lippincott .....per doz., $12.00
Axes, Double Bit, James & Co .....per doz., 10.00
Drain Tools, list .....dis 20&7½ %
Hoes, Planters' .....dis 60 %
Hoes, Scovill Pattern .....dis 60 %
Hoes, Handled, Square Eye, German .....dis 60 %
Handles, Cross Cut .....per doz., $2.25
Handles, Shovel, Bent, Bored, Riveted..per doz., 2.00
Saws, Circular .....dis 50 %
Saws, Long .....dis 45 %
Saws, Cross-Cut, H. B. & Co., Champion, per foot net $0.27
Saws, Cross Cut, Lippincott, Champion, per foot net $0.25
Shovels, list .....dis 20&7½ %
Spades, list .....dis 20&7½ %
.....dis 20&7½ %

For Net Bottom Prices see Page Adv. *Iron Age*, FEB. 11th.

BROUGHTON'S
BURGLAR-PROOF SASH LOCKS.
(Patented Oct. 7th, 1879.)
FOR NET BOTTOM PRICES SEE PAGE AD. IN IRON AGE, FEB. 11th.

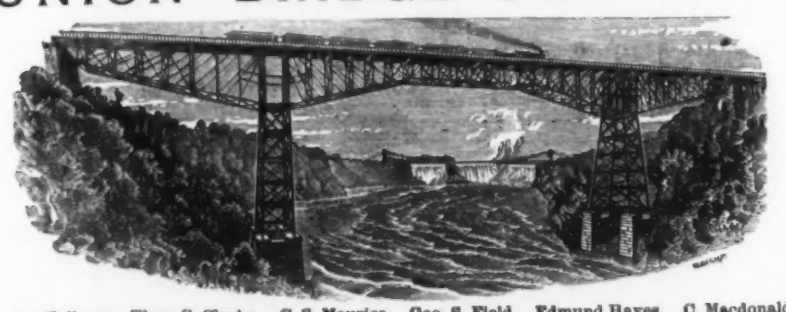


No. 210, Ornamental Iron, Iron Knob, fine finish, Etruscan Bronze $0.60
No. 211, Ornamental Iron, Iron Knob, fine finish, Olympian Bronze ..... .75
No. 212, Ornamental Iron, Iron Knob, fine finish, Pompeii Bronze ..... .85
No. 213, Ornamental Iron, Iron Knob, Nickel-plated 1.25
No. 214, Ornamental Iron, Iron Knob, Nickel-Plated Rich Old Gold inlaid 1.50
No. 215, Ornamental Iron, Iron Knob, Nickel-plated, Pale Old Gold inlaid 1.60
No. 216, Ornamental Iron, Iron Knob, Nickel-plated, Fire Old Gold inlaid 1.75
No. 21 Ornamental Iron, Iron Knob, Nickel-plated, Crimson Old Gold inlaid 1.85
No. 218, Ornamental Iron, Iron Knob, Nickel-plated, Blue Old Gold inlaid 1.90
No. 219, Ornamental Iron, Iron Knob, Nickel-plated, Green Old Gold inlaid 1.95
No. 220, Ornamental Iron, Iron Knob, Nickel-plated, Copper Old Gold inlaid 2.00
No. 221, Ornamental Iron, Iron Knob, Nickel-plated, Lemon Old Gold inlaid 2.05
No. 222, Ornamental Cast Brass, Polished and Lacquered 2.65
No 223, Ornamental Cast Brass, Nickel-plated 3.00

MANHATTAN HARDWARE CO.,
READING, PA., U. S. A.,
MANUFACTURERS OF
LOCKS of Every Description,
AND A FULL LINE OF
GENERAL BUILDERS' HARDWARE.

Special net prices to be found in *Iron Age* whenever changes occur.
The only manufacturers in the United States who quote bottom prices to all dealers without favoring any class.
Fine Gray Iron Castings of every description, also Real Bronze and Brass Castings, made to order at very low prices; Pattern Making, Japanning, Bronzing, Tinning, &c.
Our goods are known and liked wherever sold.
Orders received will be filled at last prices quoted in *The Iron Age*.
We do no underhand business, but quote alike to all for quantities less than $1000.
Our terms are strictly 15 days, f. o. b. Reading, no charge for cases or cartage.

UNION BRIDGE COMPANY.



Charles Kellogg. Thos. C. Clarke. C. S. Maurice. Geo. S. Field. Edmund Hayes. C. Macdonald.

CIVIL ENGINEERS

And Constructors of Iron and Steel Bridges, Viaducts, Roofs, Elevated Railroads, Marine Piers, Etc.

Works: Athens, Pa. (Late Kellogg & Maurice.) Capacity, 14,000 tons.
Works: Buffalo, N. Y. (Late Central Bridge Works.) Capacity, 12,000 tons.

DESIGNS AND ESTIMATES WILL BE SENT ON APPLICATION TO

UNION BRIDGE COMPANY, 18 Broadway, New York.

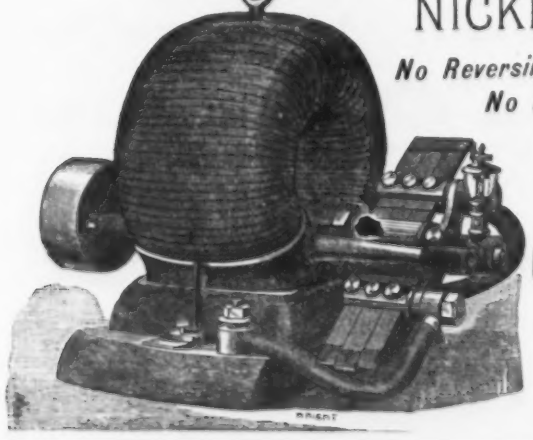
Steel Door Hangers

FOR EVERY PURPOSE.

Anti-friction Steel Barn Door Hangers.
Three sizes of Steel Common Hangers.
Anti-friction Steel House Door Hangers.
Heavy and Extra Heavy Anti-friction Hangers for Warehouses, Freight Depots, &c.
Anti-friction Steel Elevator Hangers for Iron or Wooden Doors.
Special shapes and sizes of Hangers made to order.
All Hangers made for either Iron or Wood Track.
Wrought-Iron, Lock-Joint, Round-Edge Hanger Track in any desired lengths and sizes.
Track Brackets, Stay Rollers, Combination Latches, Automatic Gate Hinges.
The most complete and finest line of these goods manufactured.
Prices the lowest. Catalogues and Lists on application.

SCRANTON MFG. CO., 68 to 74 W. Monroe St., Chicago.

THE MATHER DYNAMO-ELECTRIC MACHINE



FOR
NICKEL-PLATING.
No Reversing, No Noise, No Water, No Spark.
SATISFACTION GUARANTEED.
MANUFACTURED BY
THE
EDDY ELECTRIC MFG. CO.
SUCCESSORS TO
A. H. EDDY,
Hartford, Conn.
(SEND FOR CIRCULAR.)

☞ THE BEST IS THE CHEAPEST. ☜
THE BRUSH-SWAN ELECTRIC LIGHT CO.,
W. L. STRONG, *President.* A. D. JUILLIARD, *Vice-President.* G. McFALL, *Secretary.*
R. W. ABORN, *Treasurer.* JOHN B. POWELL, *Gen'l Manager.*
REMOVED to Nos. 204, 206, 208, 210 Elizabeth Street, New York,
Where Electric Apparatus for all the various modes of lighting and transmitting of Power are in operation. **No other** system is as **economical** in Installation and Maintenance. **No other** Electric Light is as **durable**—the first machines made are still in daily operation.

The System Comprises
- Arc Lights of various sizes.
- Arc and Incandescent Lights from one Dynamo and Circuit.
- Incandescent Lights of various sizes from special Dynamo for Central Station Lighting

Cost of Apparatus greatly reduced. Surveys and Estimates by experts.

J. E. QUACKENBUSH & SON,
MANUFACTURERS OF
Porcelain, Mineral & Jet Knobs & Escutcheons.
Send for Price List and Terms.
OFFICE 333 5th Ave., N. Y.

POST'S EUREKA SAP SPOUTS.

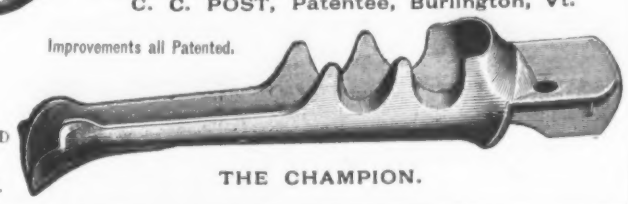
The Sugar Makers' First Choice.
10,000,000 Sold to Replace Various Other Kinds.
Twenty-Five Per Cent. More Sugar and a Better Quality

SPOUT No. 1.
Actual size, with heavy Wire Hanger, that does not break like Hangers cast on a spout.

than from any others, is the verdict of over **20,000** Maple Sugar Makers who use them. Their perfect working with satisfaction is guaranteed.
Agents wanted in every Maple Sugar Town. **Descriptive Circulars, with Price Lists and** Sample pouts, sent free to the trade only. Owing to the unusually heavy orders at this season of the year, it is necessary that all Agents (and those desiring agencies) forward their orders for the coming **sugar season as early as possible**, to give the required time for supplying **all demands**, and that shipments by freight can be made so as to reach their destination in due season. **In ordering state distinctly whether to ship by freight or by express** Write immediately for Agency to
C. C. POST, Patentee, Burlington, Vt.

SELL **Eurekas** ONLY; THEN YOU AND YOUR CUSTOMERS ARE MADE HAPPY.

Improvements all Patented.



THE CHAMPION.

Jarecki's Screw Plate and Pipe Cutter.

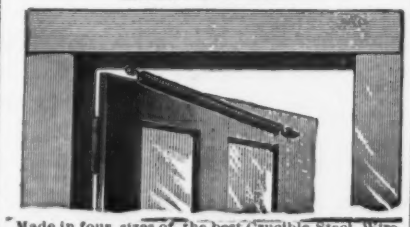
☞ WRITE FOR DISCOUNT AND DESCRIPTION.

No. 1	Cuts off and Threads	⅛, ¼, ⅜, ½	$14.00
No. 2	"	⅜, ½, ¾, 1	16.00
No. 3	"	¾, 1, 1¼	20.00
No. 3a	"	1, 1¼, 1½, 2	22.50
No. 4	"	¾, ¾, 1, 1¼, 1½, 2	
No. 4a	Cuts off and Threads	1½, 2, 2½, 3	$35.00
No. 4s	"	2½, 3, 3½, 4	50.00
No. 5	"	4½, 5, 6	75.00

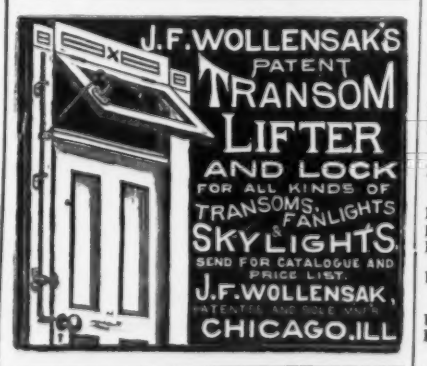
JARECKI MFG. CO., ERIE, PA.,
Manufacturers of Malleable and Cast-Iron Pipe Fittings, Brass and Iron Valves and Cocks for Steam, Gas, Water and Oil; Pumps, Machinery and Supplies for Artesian Wells. ☞ Illustrated Catalogue on application.

THE PERFECT DOOR SPRING.

Cheap, Simple, Durable, Effective.
FOR LIGHT AND HEAVY DOORS.
Indorsed by the Trade.



Made in four sizes of the best Crucible Steel Wire. The smaller sizes have no equal for screen and other light doors.
COILED WIRE BELTING CO., 93 Cliff St., New York.



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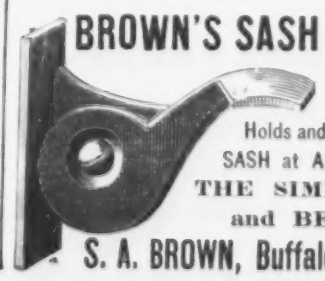
EMPIRE PORTABLE FORGE CO.,
COHOES, N. Y.

Metropolitan Agricultural Works.

Iron Frame Cultivators and Horse Hoes, Cucumber Wood Pumps, Canal Barrows, Corn Shellers, Hay Cutters, Grindstones mounted on frames, Steel goods of all kinds.
H. B. GRIFFING, 70 Cortlandt St., New York.

BROWN'S SASH LOCK



AND SUPPORT
Holds and LOCKS SASH at ANY point.
THE SIMPLEST and BEST.
S. A. BROWN, Buffalo, N. Y.

BOSTON.

Reported by Bigelow & Dewse.

Anvil & Vise.—

	10	20	30	40	
Cheney	$3.50	4.50	5.50	6.50	dis 25 %

Eagle, Fisher & Norris, No. 00, $1.75; 0, $2.25; 1, $2.75; 2, $3.25; 3, $4.00; 4, $4.50; 5, $5.25; 6, $6.00; 7, $6.50; 8, $7.25; 9, $8.25.
100 ℔ and over 10¢ ℔ ..... dis. 20 %

Augers & Bitts.—
L'Hommedieu's Ship Auger ..... dis 15 %
Jenning's Bitts ..... dis 25 %
Cook's Bitts ..... dis 50 %
Shepardson's Double-Cut Bitts ..... dis 45 %
Shepardson's Double Gimlets ..... dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz., $48; No. 3, ₩ doz., $60 list ..... dis 20 %
Bonney's Extension Hollow Augers ..... ₩ doz $36.00
Pierce's Bitts ..... dis 50 %
Griswold Bitts ..... dis 60&10 %

Axes.—Blue Jackets ..... ₩ doz $6.50

Ax Handles.—

Oak Extra, 31 in., No. A	₩ doz $2.50
Oak Extra, 34 in., No. A	₩ doz 2.50
Oak Extra, 31 in., No. B	₩ doz 2.00
Oak Extra, 34 in., No. B	₩ doz 2.00
Oak Extra, 31 or 34 in., No. C	₩ doz 1.40

Axle Clips ..... dis 50 %
Balances.—Chatillon's ..... dis 40 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers) ..... ₩ ft., 2¢
Cast Half Round ..... ₩ ft., ⅜, 2½¢; ½, 3¢
Wrought Round ..... ₩ ft., ⅜, 3¢; ½, 4¢; ¾, 6¢
Bells.—Connel's Crank Gong, reduced list.. dis 20&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879 ..... dis 40 %
Brass M. B. & D. reduced list, 1879 ..... dis 33⅓ %
Blind Fasts.
No. 6 Fasts ..... ₩ C sets 6.00
Shedd's ..... ₩ C sets 6.50
Blind Hinges.—Mall. Hook, 3 holes.. ₩ C sets 7.00
Blocks.—Tackle ..... dis 20 %
Brad Awl Handles.—
Phœnix Adjustable ..... ₩ doz $2.00
Belts.—Norway Iron Carriage ..... dis 75 %
Common Carriage, new list ..... dis 75&10 %
Eagle Carriage ..... dis 75 %
Borax.—Refined ..... ₩ ℔ 12¢
Boring Machines.—
Eagle Upright, each ..... $5.50 list } dis 50 %
Eagle Angle, each ..... 6.75 list }
Braces.—Barber's ..... dis50 %
Spofford's ..... dis 50&5 %
Backus's.
Bracket Saws.—Holly Scroll Saw ..... each $2.25
Bracket Saws, extra quality, to No. 5 ..... ₩ gro. 0.75
Steel Frame, with patterns ..... ₩ doz 6.00
Lester ..... dis 20 %
New Rogers, all iron ..... dis 25 %
Bracket Saw Blades.—Griffith's pat., ₩ gross 70¢
Brackets.—
P. S. & W. Flower Pot, reduced list ..... dis 40&10 %
Bronzed Shelf M. B. & D., new list ..... dis 50&10 %
Store Shelf ..... dis 40&10 %
Butts.—Union Fast Joint ..... dis 60&10 %
Union Loose Joints ..... dis 70&10 %
Union Japanned Acorn ..... dis 70&10 %
Union Silvered Acorn ..... dis 70&10 %
Union Boston Finish ..... dis 75&10 %
Union Spiral Spring ..... dis 25&10 %
Wrought Brass ..... dis 70 %
Carriage Bolts.—Eagle Norway ..... dis 75 %
Common, new list ..... dis 75&10 %
Carriage Jacks.—Climax No. 1 ..... ₩ doz $30.00
Climax No. 1½ ..... ₩ doz 15.00
Climax No. 2 ..... ₩ doz 13.50
Universal ..... dis 25 %
Universal No. 1 ..... each $2.00
Universal No. 2 ..... each 3.00
Universal No. 3 ..... each 6.00
Universal No. 4 ..... each 6.00
Universal No. 5 ..... each 6.50
Cartridges.—U. S. Cartridge Co. ..... dis 60 %
Cards

Watson's make Horse & Curry	dis 10 %	Rev. List, Aug., 1883.
Watson's Cotton	dis 10 %	
Watson's Wool	dis 10 %	

Casters.—Bed and Table ..... dis 50&10 %
Chain.

Coil 3-16	₩ ℔ 9¢
Coil ¼	₩ ℔ 7¢
Coil 5-16	₩ ℔ 6¢
Coil ⅜	₩ ℔ 5¢
Coil 7-16	₩ ℔ 5¢
Coil ½	₩ ℔ 5¢

Chalk.—White, Carpenter's ..... ₩ gross 60¢
Red, Carpenter's ..... ₩ gross 80¢
Blue, Carpenter's ..... ₩ gross $1.00
Crayons ..... 12¢
Chisels.—Peck, Stow & Wilcox ..... dis 70&10 %
Underhill, Framing ..... dis 40 %
Buck's Chisels ..... dis 30 %
Coal Hods.—Galv'd, New List ..... dis 60 & 10 %
Japanned, New List ..... dis 60 & 10 %
Cocks.—Brass. L. F. & Co. ..... dis 50&10 %
Coffee Mills.—New List ..... dis 45&10%
Copper Rivets.—..... dis 50 %
Cordage.—Manila, usual trade dis 1¢ ..... ₩ ℔ 12½¢
Jute ..... ₩ ℔ 7¢
Cow Ties ..... dis 50&10 %
No. 30, 3 ft. No. 6 Wire, with toggle ..... ₩ doz $3.80
No. 35, 3 ft. No. 6 Wire, with snap ..... ₩ doz 4.00
No. 40, 3½ ft. No. 6 Wire, with toggle ..... ₩ doz 4.50
No. 45, 3½ ft. No. 6 Wire, with snap ..... ₩ doz 4.50
No. 50, 4 ft. No. 4 Wire, with toggle ..... ₩ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap ..... ₩ doz 5.00
No. 60, 4½ ft. No. 3 Wire, with toggle ..... ₩ doz 5.60
No. 65, 4½ ft. No. 3 Wire, with snap ..... ₩ doz 5.80
Crow Bars.—Cast Steel ..... ₩ ℔ 5¢

Cutlery.—Pocket American Shear Co.'s ..... dis 40 %
Butcher Knives, Wood's, Lap Bolster, Square Handle ..... dis 40 %
Steak Knives ..... dis 40 %
Lap Bolster, Oval Handle ..... dis 40 %
Sticking ..... dis 40 %
Skinning ..... dis 40 %
Butcher, Common Round Handle, Wood's ..... dis 40 %
Shoe Knives, Wood's ..... dis 30 %
Dividers.—Cook's ..... dis 25 %
Dog Collars ..... dis 20 %
Door Springs.—Torrey's Rod ..... ₩ doz $1.62
Imitation Torrey's Rod ..... ₩ doz 1.45
Gem Coil, new list ..... dis 50&10 %
Crown ..... ₩ doz $1.25
Warner's ..... ₩ doz 1.75
Door Stops.—Thurston's ..... dis 50 %
Drawer Knobs.—Thurston's ..... dis 50 %
Drills.—Morse Bitt Stock } dis 50 %
Morse Straight Shank }
Emery.—Wellington Mills ..... ₩ ℔ 10¢
Walpole Emery Mills ..... ₩ ℔ 5¢
Turkish, in 10 ℔ cans ..... ₩ ℔ 7¢
Enameled Ware.—
Standard Mfg. Co. Kettles ..... dis 50 %
Standard Sauce Pans ..... dis 25 %
Felloe Plates.—Wrought ..... ₩ ℔ ¢
Files.—American File Co. ..... dis 60 %
Nicholson File Co ..... dis 60 %
Fluting Machines.—Knox List, $4.00 ..... dis 25 %
Forks.—W. C. & Co. ..... dis 60 %
Eastern Tool Co.'s. Manure ..... dis 60 %
Gimlet Bits.—
Genuine German, No. 125, 1-32 to 3-32 ..... ₩ doz $1.00
Pierce's ..... ₩ doz .88
Glass Cutters.—Combination Glass Cutter and Knife Sharpener ..... ₩ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, $11.50 ₩ dos. dis 50 & 10 %
Hammers.—Maydole's ..... dis 25 %
Hartford Hammer Co ..... dis 20 %
Hangers & Rollers.—Anti-Friction ..... dis 50 %
Acme Rollers ..... dis 50 %
Climax ..... dis 50 %
Common Hangers ..... dis 50&10 %
Common Rollers ..... dis 50&10 %
Victor Hangers ..... dis 50 %
Victor Rail ..... dis 50 %
Hand Screws ..... dis 10 %
Hatchets.—C. F. Dowse, new list ..... dis 40 %
Underhill ..... dis 40 %
Hay Knives.—Lightning ..... ₩ doz $18.00, net
Hinges.—Strap and T (new list) ..... dis 65 %
Providence Plate ..... ₩ ℔ 5 ¢
Wrought Screw Hook ..... ₩ ℔ 5 ¢
Hoes.—Eastern Tool Co ..... dis 60&10 %
W. C. & Co.'s ..... dis 60 %
Hooks and Staples.—Brewers (new list) ..... dis 70 %
Horse Nails.

	No. 6	7	8	9	
Putnam Pointed	.24	.22	.21	.20	5&7 %
Bridgewater	.23	.21	.20	19	30 %

Ice Cream Freezers.—Packer's, new list dis 50&10%
Knobs.—"Norwalk." New list ..... dis 50 %
Silver Glass ..... dis 50&10 %
Silver Glass Bell Pulls ..... dis 50&10 %
Lanterns.—Tubulars, No. 0 ..... ₩ doz $7.50
Lawn Mowers.
Continental ..... dis 40&10 %
Quaker City ..... dis 40&10 %
National ..... dis 50 %
Lead.—Sheet ..... ₩ ℔ 7 ¢
Pipe ..... ₩ ℔ 6½ ¢
Locks.—Norwalk ..... dis 50 %
Eagle Cabinet ..... dis 40 %
Eagle Trunk ..... dis 15 %
Mallory, Wheeler & Co ..... dis 66⅔ %
Manure Forks.—W. C. & Co ..... dis 60 %
Eastern Tool Co.'s ..... dis 60 %
Mattocks.
K. P. & Co., Long Cutter, $16.00 ₩ doz ..... dis 50 & 10 %
K. P. & Co., Short Cutter, $15.50 ₩ doz. .dis 50 & 10 %
K. P. & Co., Pick Cutter, $16.00 ₩ doz .... dis 50 & 10 %
Measuring Tapes.—Eddy's ..... dis 20 %
Meat Cutters.—Miles' Challenge ..... dis 30 %
Hale's (new list) ..... dis 40&10 %
American ..... dis 33⅓ %
Money Drawers.—Tucker's Alarm ..... ₩ doz $22.50
Mouse Traps.—Delusion ..... ₩ doz 1.25
Novelty ..... ₩ doz
Nails ..... ₩ keg
Oilers.—Zinc and Tin ..... dis 60 %
Brass and Copper ..... dis 50 %
Ox Bows.—Extra finished and varnished .... dis 15 %

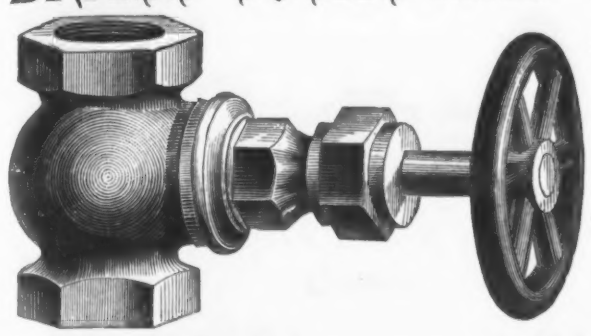
1¼ in., ₩ doz. pair	$7.00	2 in., ₩ doz. pair	$10.00
1¾ in., ₩ doz. pair	9.00	2½ in., ₩ doz. pair	12.00

Paper.—Common Tarred Sheathing ..... ₩ ℔ 1¾¢
Eagle Brand Tarred Sheathing ..... ₩ ℔ 2 ¢
Common, Dry Sheathing ..... ₩ ℔ 1¾¢
Eagle Brand Dry Sheathing ..... ₩ ℔ 2½¢
Picks.—K. P. & Co., Adze Eye, 5 to 6 ℔ $12.00. dis 50 & 10 %
K. P. & Co., Adze Eye, 6 to 7 ℔ $13.00 ..... dis 50 & 10 %
Planes.
Auburn Tool Co., Bench ..... dis 20 %
Auburn Tool Co., Fancy ..... dis 15 %
Auburn Tool Co., English Iron ..... dis 15 %
N. Y. Tool Co., Bench ..... dis 25 %
Plated Ware.—Rogers & Bro ..... dis 50&10 %
Pliers.—Vom Cleff & Co.'s ..... net list
Button's Wire Pliers ..... dis 33⅓ %
Plumb & Levels.—Stanley R. & L. Co.. dis 70&10 %
Potato Diggers.—W. C. & Co., reduced list. Eastern Tool Co.'s ..... dis 60 %
Pulleys.—Acme or Excelsior, 1¼ in ..... ₩ doz 22¢
Acme or Excelsior, 2 in ..... ₩ doz 24¢
Pumps.—Union Manufacturing Co.
Iron Cistern ..... dis 50 %
Iron Pitcher Spout ..... dis 60 %
Copper ..... dis 30 %
Rivets.—In 5 ℔ papers ..... dis 45 %
Burrs ..... dis 50 %
Copper ..... dis 60 %
Razors.—Torrey's ..... dis 20 %
Rules.—Stanley, Boxwood ..... dis 75&10 %
Stanley, Ivory ..... dis 50&10 %
Sad Irons.—Common ..... ₩ ℔ 3¢
Laundry ..... ₩ ℔ 6¾¢
Tailors' Geese ..... ₩ ℔ 6 ¢
Enterprise "Potts" ..... dis 35 %
Sash Locks.—King & Hutchinson's, new list. dis 40 %
Sandpaper.—Baeder & Adamson ..... dis 40 %
Sash Weights.—Patent Eye ..... ₩ ℔ 1¼¢
Saws.—Hand Saws, Diston's ..... dis 20 %
Cross-Cut Saws.
Diston's, Common Tooth ..... ₩ foot 68¢, dis 45 %
Diston's Great American Tooth.. ₩ foot 68¢, dis 45 %
Boynton's Lightning Tooth ..... ₩ foot 45¢
M. B. & D., Hand Saws ..... dis 33⅓ %
Richardson Bros ..... dis 25 %
Saw Blades.—Diston ..... dis 20 %
Welch & Griffith, Extra ..... ₩ doz $7.20
Welch & Griffith, No. 2 ..... ₩ doz 6.00
Scales.—Fairbanks ..... dis 20 %
Screws.
Flat-Head Iron ..... new list, dis 75&10 %
Flat-Head Brass ..... new list, dis 75 %
Round-Head Brass ..... new list, 70 %
Round-Head Iron ..... new list, 70&10 %
Grilley Round-Head Nickel-Plated Common ..... 70 %
Scythes.—Clippers, in boxes ..... ₩ doz $6.00
Shaves.—Kimball's ..... ₩ inch 7½¢
Watrous ..... dis 20 %
Shears.—American Shear Co., new list ..... dis 70 %
Shot.—Le Roy ..... ₩ ℔ 6¢
Shovels.—O. Ames, new list ..... dis 20 %
O. Ames, other brands, new list ..... dis 20 %
Sinks.—Magee Patent ..... dis 30 %
Snow Shovels $3.75
Skates.—Union ..... dis 40 %
Stocks and Dies.—King's ..... dis 10&5 %
Tacks.
Swedes Tinned ..... dis 50&10 %
Swedes Iron ..... dis 50&10 %
Gimp and Lace ..... dis 45&10 %
Copper Tacks ..... dis 50&10 %
Traps.—Oneida, Genuine ..... dis 33⅓ %
Oneida, Imitation, H. & N ..... dis 60 %
Blake's ..... dis 40&10 %
Vises.—Simpson's Adjustable ..... dis 25&5 %
Howard Vise Co ..... dis 25 %
Prentiss' ..... dis 20 %
Weather Strips.—Packer's ..... ₩ doz $4.50
Browne's Flexible Rubber ..... dis 20 %
In 25 feet boxes: No. 1, ¼ in. wide, ₩ yard, 10¢; No. 2, ⅝ in., 15¢.; No. 3, ¾ in., 20¢.; No. 4, 1 in. 25¢
Black Walnut Spring Weather Strips ..... ₩ doz $2.50
Window Springs ..... dis 35 %
Babcock's No. 3 ..... ₩ gross $6.25
Babcock's No. 4 ..... ₩ gross 4.15
Wire Cloth.—"Clinton" ..... ₩ sq. ft 2 ¢
Wire Fence.
Washburn Painted Barbed ..... ₩ ℔ 4½¢
Washburn Galvanized Barbed ..... ₩ ℔ 5½¢
Wire Goods.—Gate Hooks & Eyes ..... 70&10&5
Wrenches.—A. G. Coe's ..... dis 60 %
Girard Mfg. Co ..... dis 60&10 %
Girard Agt ..... dis 70&10 %
"Always Ready" ..... dis 25 %
Wringers.
Novelty for Common Tubs No. 2—10-inch ..... ₩ doz $27.00
" " " " No. 3—11-inch ..... ₩ doz 31.50
Excelsior for Stationary Tubs No. E—10-inch ..... ₩ doz 30.00
Excelsior for Stationary Tubs No. F 11-inch ..... ₩ doz 43.50
Excelsior with Folding Bench No. A—10-inch ..... ₩ doz 48.00
Excelsior with Folding Bench No. B—11-inch ..... ₩ doz 52.50
Novelty Set Tub, E ..... ₩ doz .....
Keystone, Wood Frame No. 1½ ..... ₩ doz .....
Keystone, Iron Frame No. 2½ ..... ₩ doz .....
Zinc ..... ₩ ℔

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES



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Plumbers' Materials.

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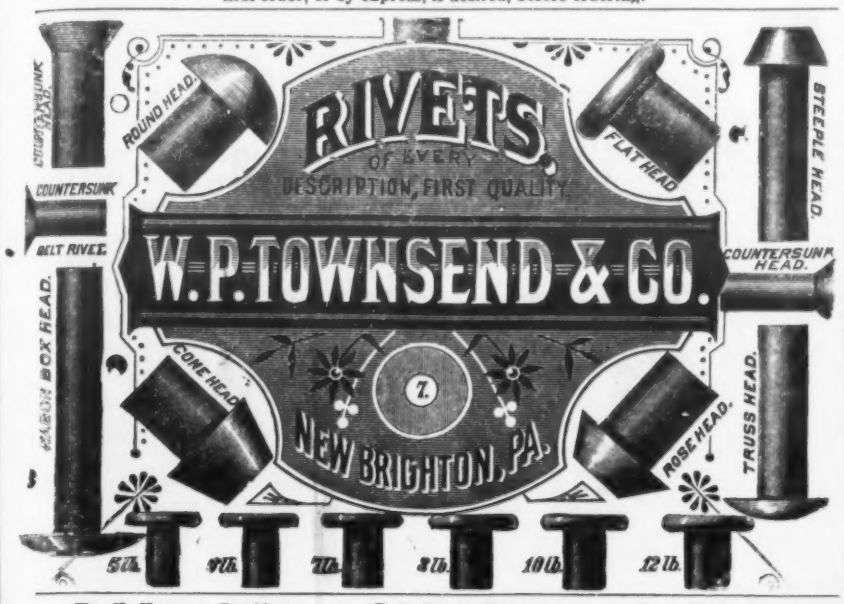

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GIMLET POINT

COACH SCREWS

Bolts, Cold-Punched Nuts & Washers,

SUITABLE FOR MACHINERY OF ALL KINDS.

Office and Works: 277 Main St., PAWTUCKET, R. I., U. S. A.

HENRY B. NEWHALL CO., Agents,

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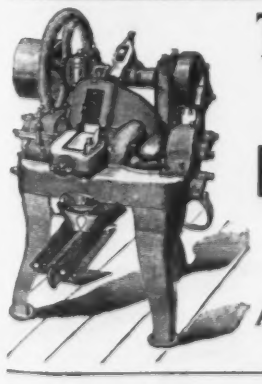
F. Armstrong, Bridgeport, Conn.

CATALOGUES AND PRICE LISTS FREE ON APPLICATION.



The American Nail Machine Co.,

MANUFACTURERS OF

AMERICAN PATENT

IMPROVED CUT NAIL MACHINES,

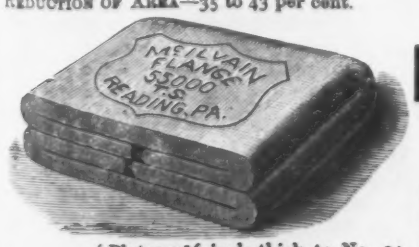
AUTOMATIC NAIL SELECTORS and NAIL FACTORY SUPPLIES.

ASHTABULA, - - - OHIO.

Prices and particulars furnished on application.

Tensile Strain. } 56,000 to 64,000 lbs.

Reduction of Area—35 to 43 per cent.



Capacity. { Plates 1⅝ inch thick to No. 14. 30 feet long. 70 inches wide.

WM. McILVAIN & SONS,

MANUFACTURERS OF

BOILER PLATE

AND

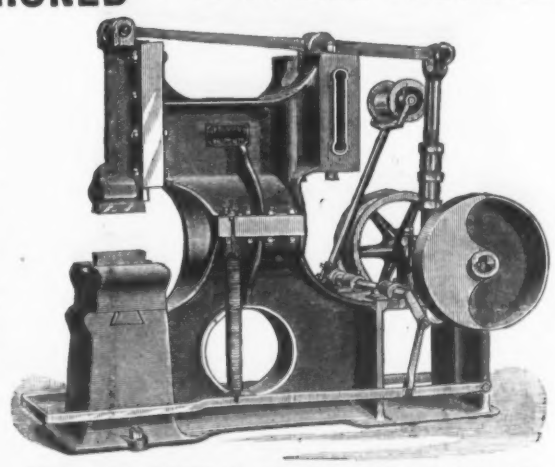
CHARCOAL BLOOMS.

Locomotive, Fire Box, Flange and Shell Iron; Plate for Bridges and Girders; Tank and Stack Iron; Boat Plate and Iron for Wrought Pipe; Plate Iron for Fire and Burglar Proof Safes.

VULCAN POWER HAMMER

CUSHIONED

TRUE, SQUARE, ELASTIC BLOW. SOLID HELVE, RUBBER CUSHIONED.



DURABLE, LOW-PRICED. Fulfills all the requirements of a First-class Hammer.

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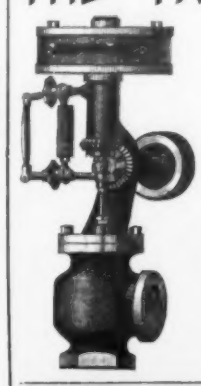
C. A. MOORE, Pres. E. L. MAXWELL, V.-Pres. H. S. MANNING, Sec. and Treas. HARRIS TABOR, Supt.

THE TABOR MANUFACTURING CO.,



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Will regulate as closely as the best automatic cut-off engine. Perfectly adapted to every type of Stationary and Portable Engine. Fitted with Speed Adjuster, Sawyer's Lever and Automatic Safety Stop.

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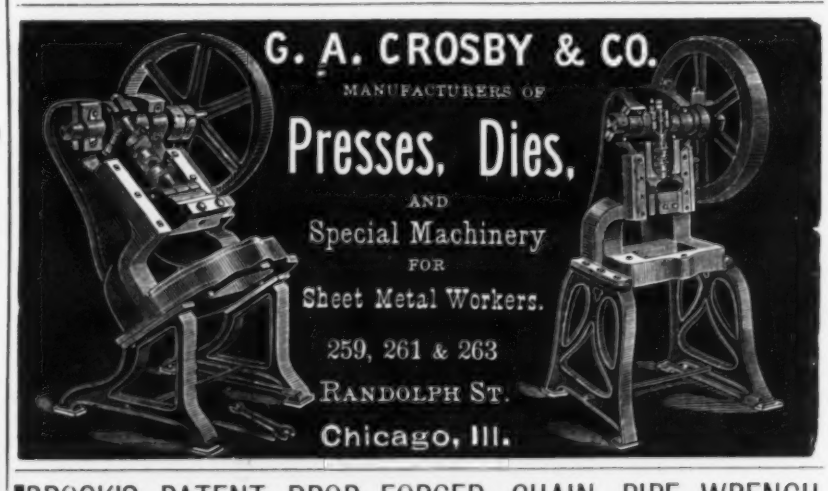

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Sheet Metal Workers.

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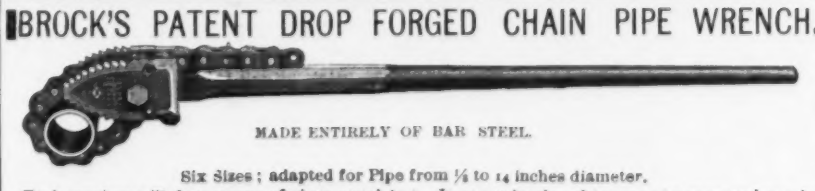

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Does not crush pipe; has a quick grip; never slips; chain will not unhitch while in use, but can be instantly released.

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IMPROVED BY M.M. BARTLETT.
Improvement Patented April 28, 1885.

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Improvement patented April 28, 1885, of which we are the sole manufacturers, has been tested with the most celebrated knives of other makers, and has proved an easier and faster Cutter than any other. Its special excellence consists in the chisel-edge tooth shown in the engraving. It may be used for cutting hay in the mow, stack and bale; also for ditching, cutting peat, or any other work for which a hay knife is used. It can be readily ground by the most inexperienced, as it requires to be ground only on one side. Should a tooth break, all that is necessary to replace the damage is to grind it once and a new chisel-tooth appears. It can ordinarily be sharpened with a common scythe stone. Try one and you will give it the preference.

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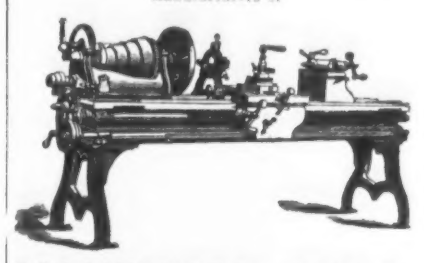

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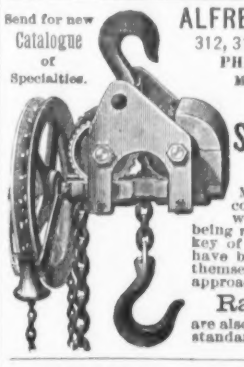

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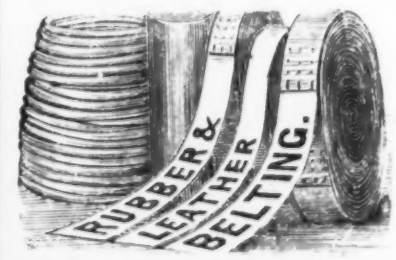

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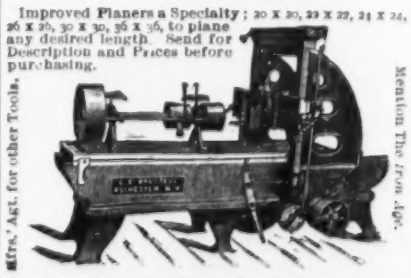

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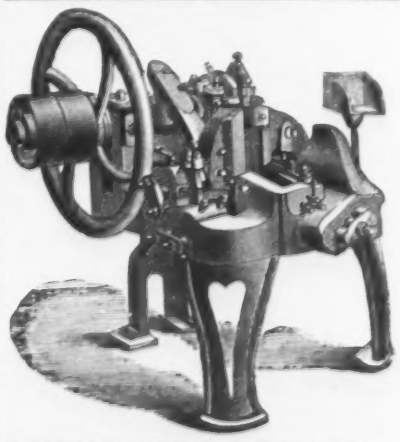

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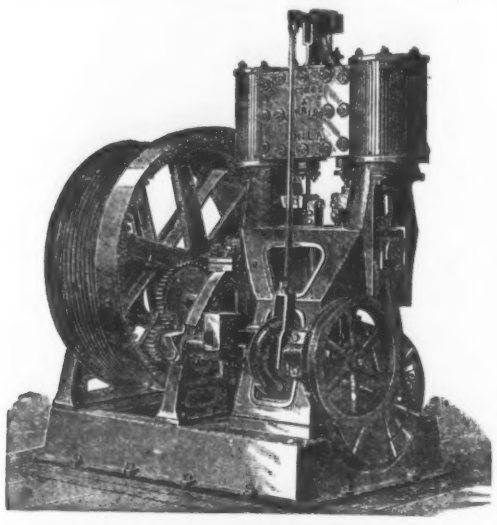

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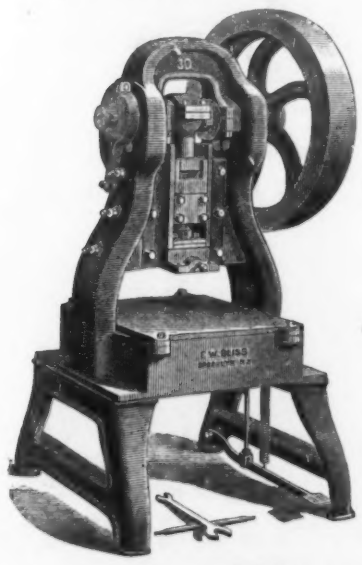

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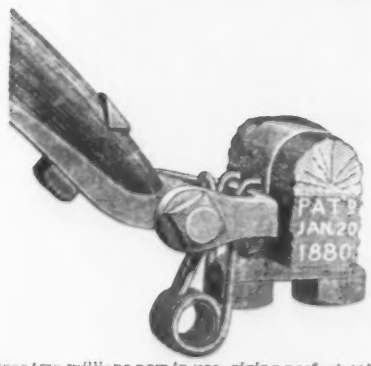

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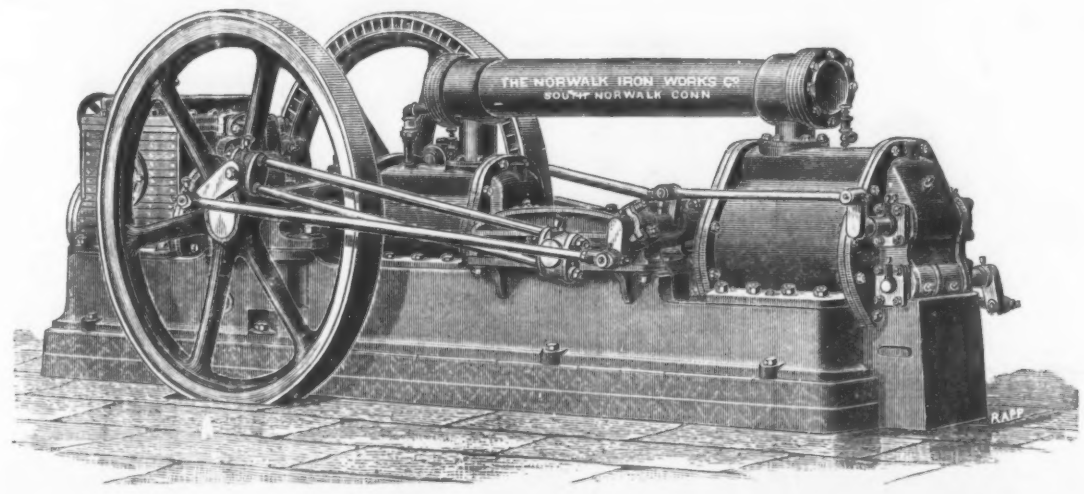

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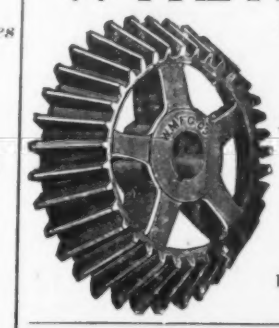

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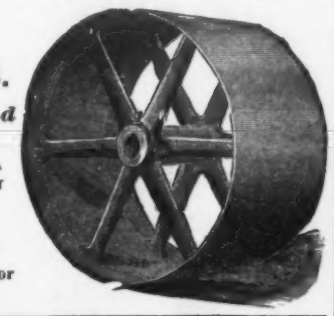

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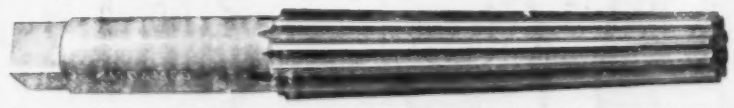

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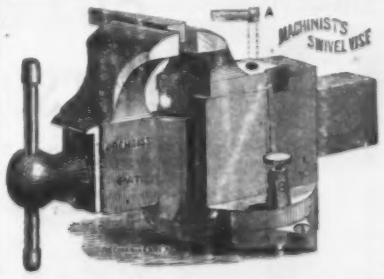

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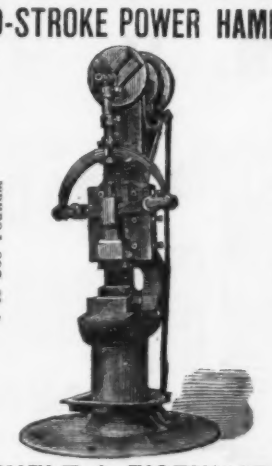

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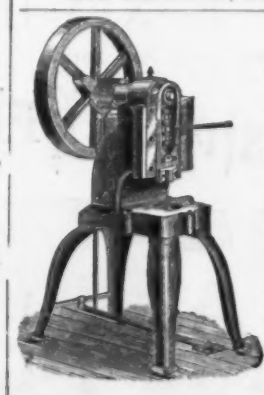

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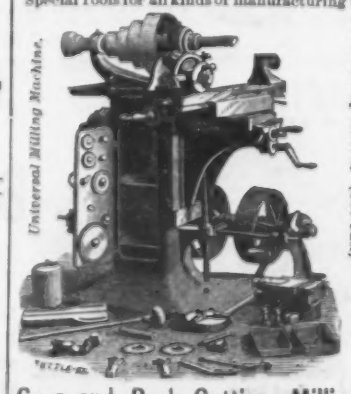

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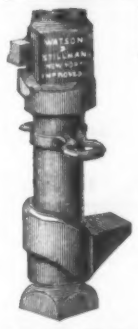

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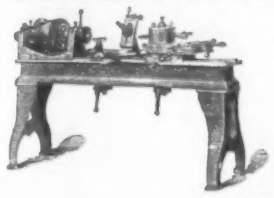

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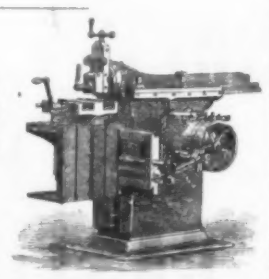

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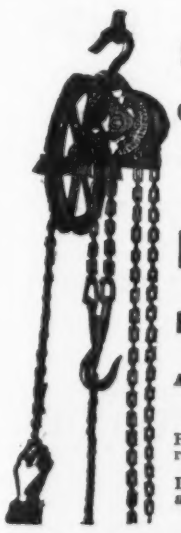

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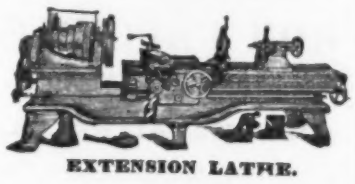

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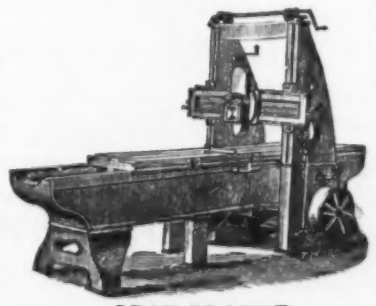

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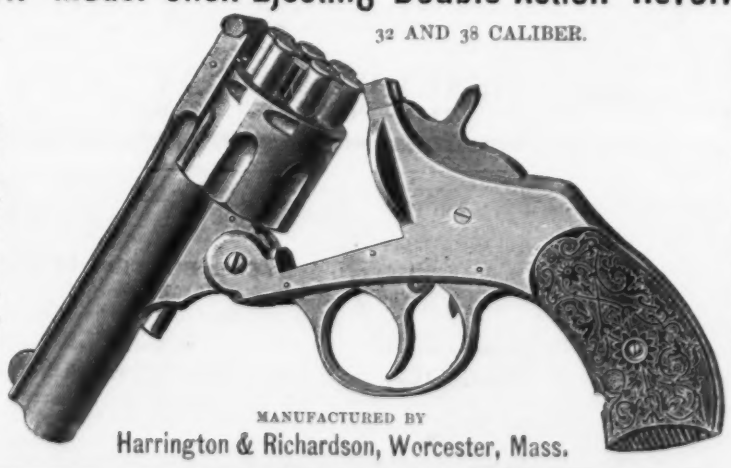

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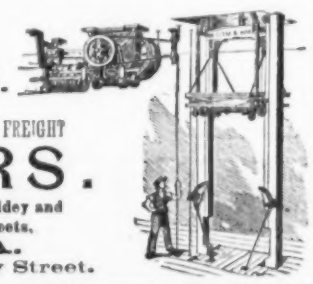

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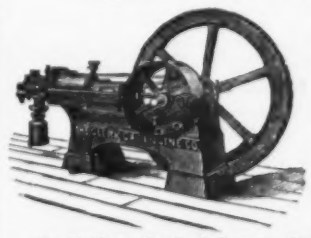

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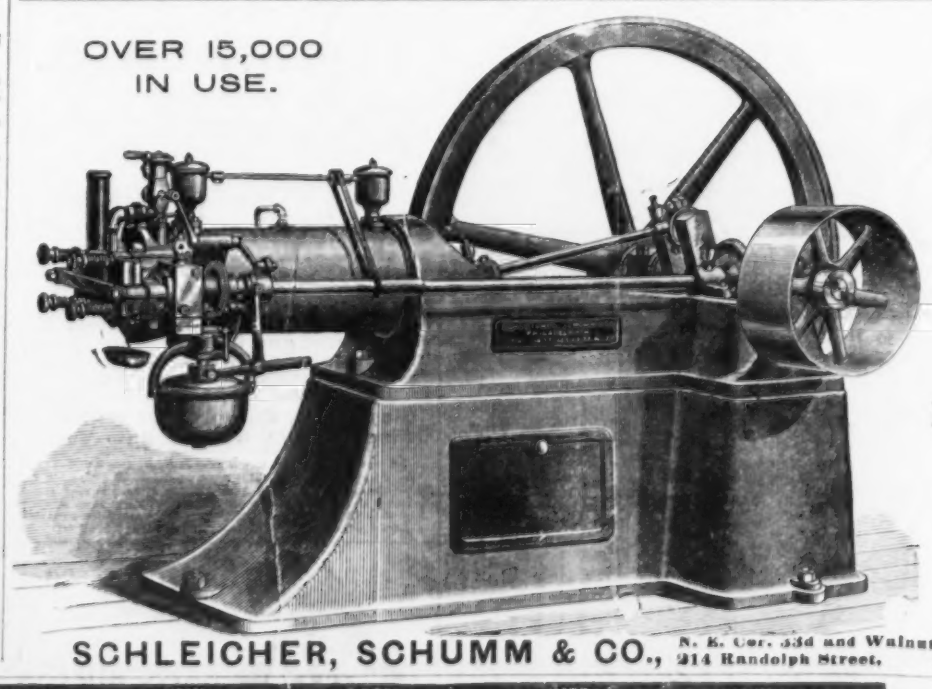

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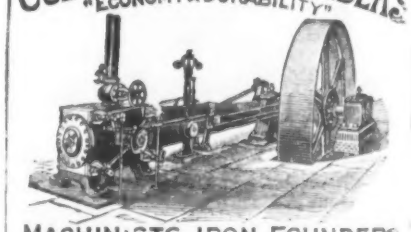

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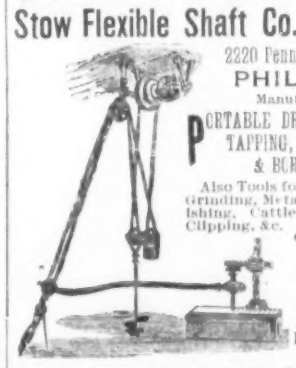

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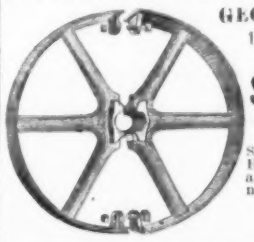

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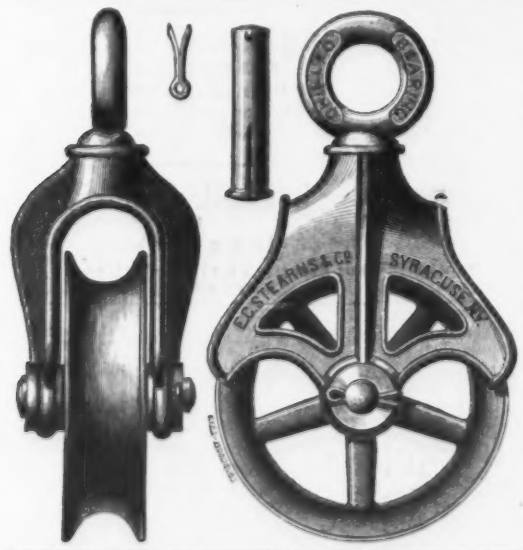

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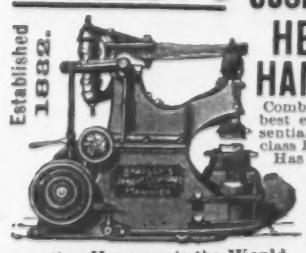

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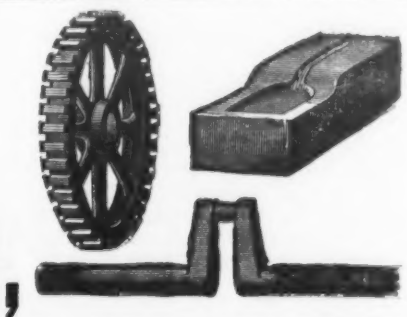

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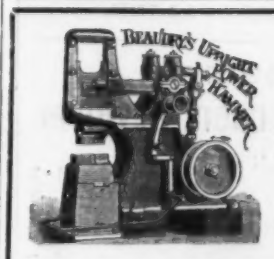

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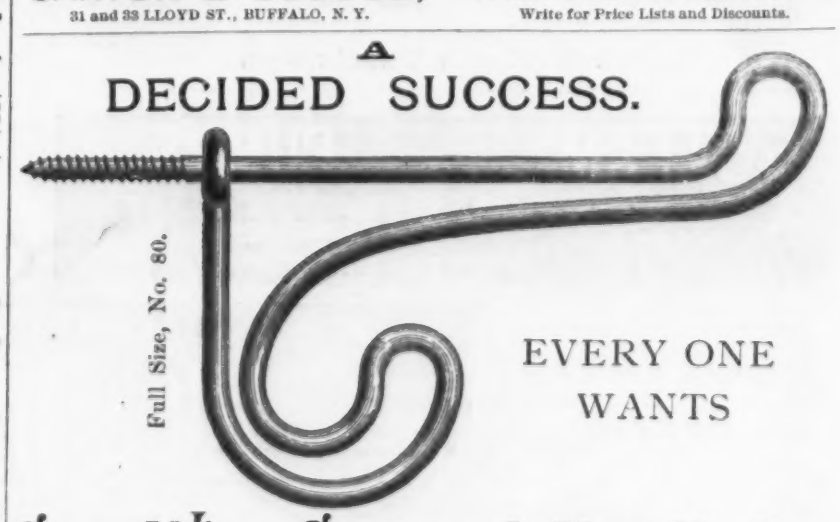

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